

# SUPPLEMENT.

## The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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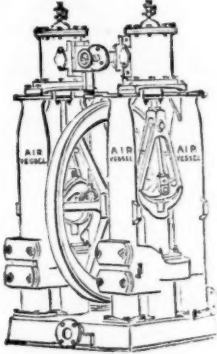
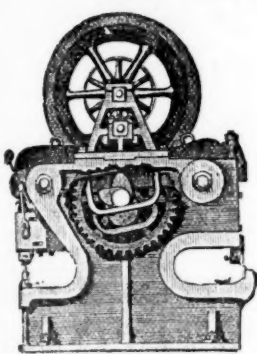
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SALFORD, MANCHESTER.

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of the largest and most approved kinds in use, SUGAR MACHINERY,  
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IN GOOD CONDITION, AT MODERATE PRICES—VIZ.,

PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES;  
STEAM CAPSTANS; ORE CRUSHERS; BOILERS and PITWORK  
of various sizes and descriptions; and all kinds of MATERIALS required for  
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Alloy, No. II., for pinions, ornamental castings, steam  
fittings, &c. £120 per ton  
" No. IV., for pinions, pumps, valves, linings,  
cylinders, &c. 130  
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This alloy has very great tensile strength 140  
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plungers, piston rings, bushes and bearings,  
for steel shafts 140  
" No. XI., special phosphor-bronze bearing metal,  
wearing five times as long as gun metal 112

The prices of castings vary according to the pattern, the quantity required, and  
the alloy used.

WIRE ROPES, TUBES OF ALL DESCRIPTIONS, &c.

STANDARD LUBRICATING OILS  
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DARK and PALE OILS for MACHINERY, RAILWAY, and MINING  
PURPOSES, from TWO SHILLINGS per gallon, and upwards.

AGENTS WANTED.

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ALEX. CHAPLIN AND CO.,

CRANSTONHILL ENGINE WORKS, GLASGOW.

PATENTERS AND SOLE MANUFACTURERS OF

CHAPLIN'S PATENT STEAM CRANES, HOISTS,

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PARIS,  
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,  
SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the  
Geographical Congress, Paris, 1875—M. Favre, Contractor, having  
exhibited the McKean Drill alone as the MODEL BORING MACHINE  
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland  
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

### THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-  
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,  
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-  
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-  
nel, the McKean Rock Drill continued to work until the pres-  
sure was reduced to one-half atmosphere (7½ lbs.), showing  
almost the entire motive force to be available for the blow  
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these  
Machines for the SEVERN TUNNEL; the LONDON AND  
NORTH-WESTERN RAILWAY for the FESTINOG TUN-  
NEL; and the BRITISH GOVERNMENT for several Public  
Works. A considerable number of Mining Companies are now  
using them. Shafts and Galleries are driven at from three to  
six times the speed of hand labour, according to the size and  
number of machines employed, and with important saving in  
cost. The ratio of advantage over hand labour is greatest  
where the rock is hardest.

These Machines possess many advantages, which give them  
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL  
USE THROUGHOUT THE WORLD FOR MINING, TUN-  
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the  
most portable—the most durable—the most compact—of the  
best mechanical device. They contain the fewest parts—have  
no weak parts—act without SHOCK upon any of the operat-  
ing parts—work with a lower pressure than any other Rock  
Drill—may be worked at a higher pressure than any other  
—may be run with safety to FIFTEEN HUNDRED STROKES  
PER MINUTE—do not require a mechanic to work them—are  
the longest feed without change of tool—work with long or  
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or  
open work. Their working parts are best protected against  
grit and accidents. The various methods of mounting them  
are the most efficient.

N.B.—Correspondents should state particulars as to  
character of work in hand in writing us for information,  
on receipt of which a special definite answer, with  
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,  
IRON, AND FLEXIBLE TUBING.

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OIL REFINERS,  
ROSIN OIL DISTILLERS,  
GREASE AND VARNISH MANUFACTURERS,  
HOLT TOWN.  
MANCHESTER.

Price List on application.

[ESTABLISHED TEN YEARS.]

DUNN'S ROCK DRILL,

AIR COMPRESSORS,

FOR DRIVING BED ROCK

TUNNELS, SINKING

SHAFTS, AND PERFORMING

OPEN FIELD OPERATIONS,

IN THE

CHEAPEST, SIMPLEST,

STRONGEST, & MOST EFFECTIVE

DRILL IN THE WORLD.

Dunn's Patent Rock Drill Company

(LIMITED).

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DRESSING MACHINE COMPANY

(LIMITED).

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IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWITH,  
SUPPLIES MACHINES under the above Company's Patents for  
DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-  
sess the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED  
BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND  
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN  
FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom  
and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines,  
Darlington, Colberry, Nanthead, and Bollyhope; the Stoncroft and Greyside  
Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the  
Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Esclair-  
mwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines,  
Darlington; also Mr. Sewell, for Argentinian Copper Mines, Peru; the Brata-  
berg Copper Mines, Norway, and Mines in Italy, Germany, United States of  
America, and Australia, from all of whom certificates of the complete efficiency of  
the system can be had.

WASTE HEAPS, consisting of refuse chaps and skimpings of a  
former washing, containing a mixture of lead, blende, and sulphur,  
DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-  
in-Teesdale, by Darlington, writing on the 20th March, 1878, says—"The yearly  
profit on our Nanthead waste heaps amounted last year to £800, besides the ma-  
chinery being occupied for some months in dressing ore-stuff from the mines. Of  
course, if it had been wholly engaged in dressing waste our returns would have  
been greater; but it is giving us every satisfaction, and bringing the waste heaps  
into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines,  
Wanlockhead, Abington, N.B., writing on 20th March, 1878, says—"I have much  
pleasure in stating that a full and superior set of your Ore Dressing Machinery has  
been at work at these mines for fully a month, and each day as the moving parts  
become smoother, and those in charge understand the working of the machinery  
better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply,  
and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines,  
says—"Your machinery saves fully one-half on old wages, and vastly more on the  
wages we have now to pay. Over and above the saving in cost is the saving in ore,  
which is a much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The  
separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close  
the mechanical mixture, in such a way as no other machines can do."

Mr. C. DODSWORTH says—"It is the very best for the purpose,  
and will do for any kind of metallic ores—the very thing so long needed for dress-  
ing-floors."

Drawings, specifications, and estimates will be forwarded on application to—

GEORGE GREEN, M.E., ABERYSTWITH, SOUTH WALES.



# HOT-AIR ENGINES

Suitable for Pumping Purposes.



SEVERAL  
Silver and Gold  
Medals

HAVE BEEN AWARDED.

Cost of fuel, 2s. 6d. per week  
per 1/2-horse power.

RE 1/2-H.P. HOT-AIR ENGINE—  
PUMPING.  
Royal Baths, Southend, March 14th,  
1877.  
Messrs. Hayward Tyler and Co.,  
London.

I am very glad to inform you that the Rider Patent Hot-Air Engine, supplied by you for pumping salt water for the warm baths, does its work remarkably well. The working of it is very simple, and consumption of fuel very small.

Yours, &c., &c., T. W. INGRAM.

RE 1-H.P. HOT-AIR ENGINES, DRIVING LATHES AND PUMPING.  
Well Meadow Steel Works, Sheffield,  
August 17th, 1877.  
Messrs. Hayward Tyler and Co.,  
London.

Gentlemen,—The 1-h.p. Patent Hot-Air Engine (for power) supplied is driving two small lathes and a small planing machine and giving satisfaction. It was set to work by a man who had never seen one before, and without any instructions to guide him. The 1-h.p. Hot-Air Engine, for pumping, has been put down at a railway station to raise water from a well to supply an engine tank. The engineer is well pleased with it, and intends having several others for the same purpose on the line.

We are, Gentlemen, yours truly,  
(Signed) EDGAR ALLEN & CO.

RE 1/2-H.P. HOT-AIR ENGINE—  
PUMPING.  
The Elms, Hereford, June 4, 1877.  
Messrs. Hayward Tyler and Co.,  
London.

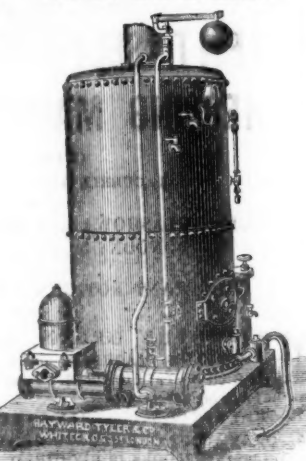
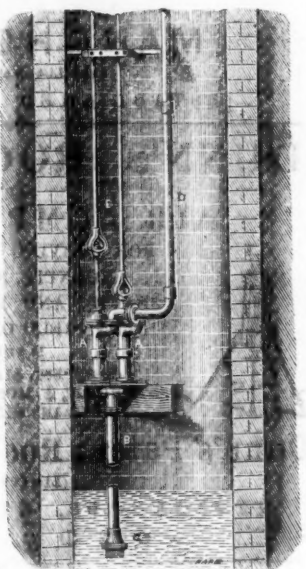
Gentlemen,—It gives me much pleasure to state that the Hot-Air Engine supplied by you to me affords me entire satisfaction. It works well and easily, and the entire water supply at my house is pumped up several hundred yards by means of this Hot-Air Engine.

Faithfully yours,  
(Signed) CHAS. ANTHONY.

RE 1-H.P. HOT-AIR ENGINE—  
PUMPING AND DRIVING MACHINERY.  
Robin Hood, Hall Green, Worcester, June 4th, 1877.  
Messrs. Hodgkin, Neuhaus, and Co., London.

Gentlemen,—The 1-h.p. Rider Hot-Air Engine supplied by you to me gives every satisfaction. It pumps water to the top of the house, cuts the chaff, crushes the oats, splits the heads, &c. I shall be very happy to recommend it to anyone—in fact, I have already done so to several.

Yours truly,  
(Signed) SAM. WALKER,  
per S. B. WALKER.



"Universal" Steam Pump on Boiler.

Hayward Tyler & Co., London.

## PATENT DUPLEX LAMPS

FOR COLLIERIES, IRONWORKS, &c.

SUITABLE FOR PIT BANKS, ENGINE HOUSES, &c., &c.



Each Lamp gives a light equal to 25 candles.

No breakage of Chimneys from heat.

Cottens last three months.

Will burn any mineral oil.

**S. HOOPER,**  
LAMP MAKER & OIL MERCHANT,  
LOWER TEMPLE STREET,  
BIRMINGHAM.

N.B.—Lamps made suitable for every purpose.

The BEST SIGNAL BELL MADE FOR MINING PURPOSES.

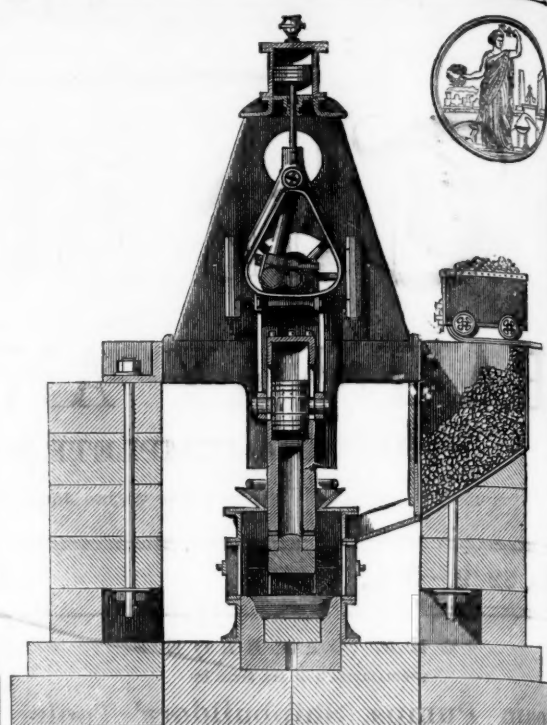
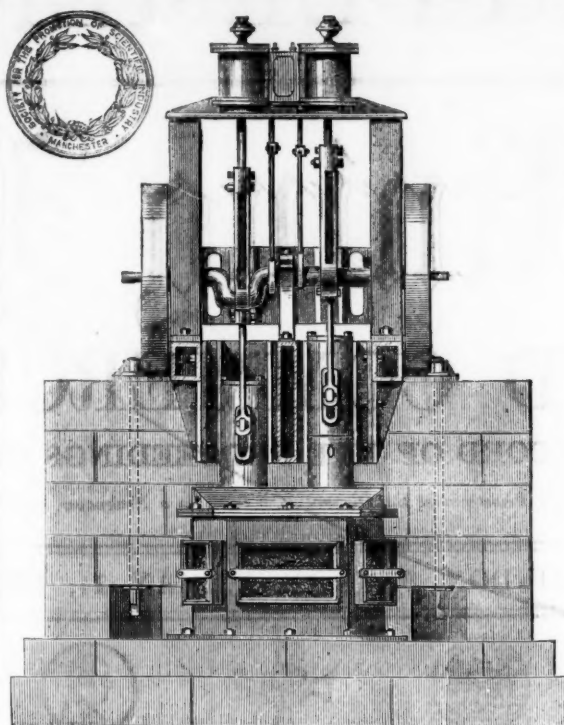
ILLUSTRATIONS ON APPLICATION.

## IMPORTANT TESTIMONY IN FAVOUR OF PARR'S LIFE PILLS, BY A LADY SEVENTY-SEVEN YEARS OF AGE:—

SIR,—I wish to inform you I have taken your Parr's Life Pills for 47 years, and no other medicine, and as I have always found them do me good I have recommended them to all my friends; and to prove the truth to you I have sent you a few lines, enclosed, which I composed and sent to one of my sons, with a box of your valuable Pills, begging of him to try them. I am now in my 77th year, and hearty and well, but unfortunately lost my dear husband five years since; but my dear children are my preservers, and I am as happy as any old maid. If you wish to make use of these lines in any way you are at liberty to do so.

S. J. CATLIN.

Boxes, 1s. 1/4d. and 2s. 9d., of all chemists.



## SHOLL'S PATENT DIRECT-ACTING PNEUMATIC STAMPERS,

For Pulverising Tin and Lead Ores, Gold Quartz, &c.,

SOLE MAKERS FOR CORNWALL,

**N. HOLMAN AND SONS,**

ST. JUST FOUNDRY, NEAR PENZANCE, CORNWALL.

All objectionable features of "wear and tear" common to the original and existing Pneumatic Stamps (driven by belts) are removed in this patent, and leather glands and stuffing boxes entirely dispensed with, the pneumatic piston being reciprocated into the compressing chambers by direct action from without. These double machines are guaranteed to be of the capacity of 30 ordinary heads of cam and lifter stamps, and engineers will at once see that, inasmuch as the power is directly applied to its work (without the medium of belts and other gearing), the minimum consumption of coal (all other conditions being equal) must be the result.

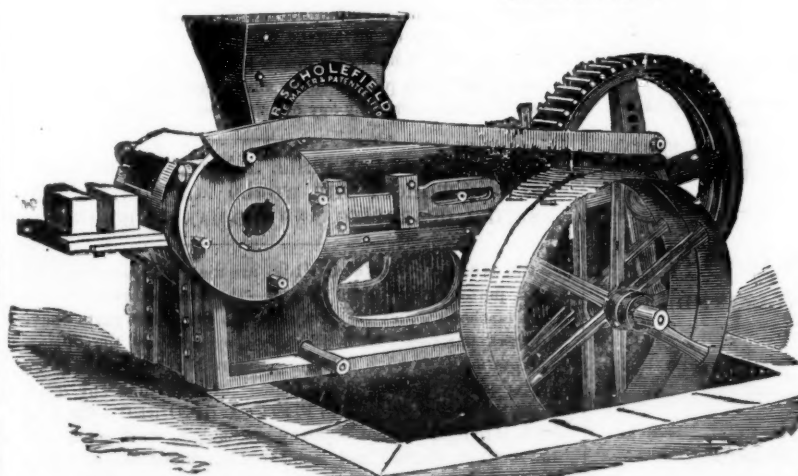
The COST OF THESE MACHINES (including boiler) is about ONE-THIRD OF THE ORIGINAL CAM AND LIFTER STAMPS, to do the same work.

ROTARY STAMPERS SUPPLIED ON THE SAME PRINCIPLE, WITHOUT STUFFING BOXES OR GLANDS, WHERE RUNNING GEAR EXISTS, OR WITH HORIZONTAL CONDENSING ENGINES AND BELTS TO DRIVE THEM, IF PREFERRED.

Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER. MINING AND OTHER MACHINERY CONSTANTLY ON SALE, NEW AND SECOND-HAND.

## R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless) is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of

production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0 8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0

Total cost of making 10,000 pressed bricks ... £1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging. As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY. SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS. KIRKSTAL ROAD, LEEDS.

## British and Foreign Safety Fuse Company,

REDRUTH, CORNWALL,

MANUFACTURERS OF

**SAFETY FUSE,**

FOR MINING AND QUARRYING PURPOSES.



PRICES ON APPLICATION.



## Original Correspondence.

## THE TIN MINES OF TASMANIA.

TO CAPT. TREGAY, OF REDRUTH, AND THE OTHER GENTLEMEN OF THE MINING INSTITUTE OF CAMBORNE.

SIR.—Were it not that the matters at issue were serious, I should be amused at the jealousy, incredulity, and suspicion with which a little information respecting our Tasmanian tin discoveries is received. Soon after I had given this information in March, 1874, a gentleman, named Wellington, went out from Cornwall to Tasmania to ascertain facts, and on his return reported that "what we called tin was only titaniferous ore, and of no value," and was greatly applauded, &c. However, the colonists began to form small companies to work this so-called titaniferous ore, and persevered in sending it home, and strange to say the tin-plate makers in Wales, in which business I am also concerned, fancied it was very good and fine tin, equal, indeed, to the best Cornish. Then came forward Capt. James, who told you we had only a little alluvial tin, soon to be worked out, and that 10 feet under the surface it was not worth working; and he, too, was believed and applauded. And now you have another gentleman obtaining applause at your meetings with similar reassuring information, and this gentleman also informs you that a dividend of 100 per cent. in one of our mines was only obtained by smelting tin for other mines. Having, however, the reports of this mine—the Mount Bischoff Company—before me, I can inform you that we lost money by the buying and smelting of the ore from the said other mines instead of making a profit from that source, and give you some further statistical information. The Mount Bischoff Mine has declared a dividend of 12,000*l.*, being 1*l.* per share on 12,000 shares, in January last (out of a balance available to the good in hand of 23,310*l.*), and not of 7400*l.*, as you suppose. We are not great capitalists in Tasmania, and only raised 7600*l.*, as so far nearly rightly stated at your meeting, to start our mine. The owner of the sections taking his payment in 4400 quasi paid-up shares.

During four years of hard work on the small capital of 7600*l.* we have obtained 3433 tons of ore, and from the proceeds paid for our plant, machinery, and smelting-works. We have paid wages to the extent of 49,310*l.* For repairs of roads and tramways, 7684*l.*; for conveyance of stores and ore, 16,835*l.*; and are now in a position to apply our future profit to dividends, and had more than sufficient in March to pay another 12,000*l.* dividend. I think this is an answer to your question "as to whether the Mount Bischoff Mining Company had paid more than 7400*l.*?" Respecting the profits of the other rich mines at Mount Bischoff and on the north-east coast of Tasmania, and the numerous patches of alluvial tin (the latter being often worked by Chinese on tribute), I have no statistical information, and without that am not disposed to express my own mere opinion; but it would, perhaps, strike any one (some Cornishmen excepted) as rather odd, when seeing the constant arrivals of their tin in London, that the colonists should send so much home merely for amusement and without profit.

However, as far as we Tasmanians are interested in your views of our tin mines, we do not wish to go so far as Cornwall to ascertain whether we have permanent lodes or mere surface deposits, being quite satisfied we have enough of both, and that we can from the proceeds give a good day's pay for a good day's work to Cornish labourers. Capt. Tregay intimates that I have some sinister design in writing to Cornish miners. My object has been openly stated from my first letter in the Journal, "that of endeavouring to persuade some of your miners to emigrate," and which I have been requested to do from the colony. We have Chinese labour pouring in, and want skilled Cornish miners to direct them, and help us to develop our metals, and we have rich gold mines as well as tin, one of these you will, I believe, soon hear enough of, and open your eyes. If tin fall, as I fear it must, to a point obliging you to close all your works, it may be cheaper to your parishes to pay the passages of miners willing to emigrate to Tasmania than to keep them at home, and be an equal advantage to both the colonists and miners.

When I visited Cornwall, in 1875, I gave my information to some of your most intelligent mining captains, and the reply they made me was that they would die hard, but it will do little good to resist the truth, or try to hoodwink the miners themselves by ignoring the fact that you cannot contend further with foreign production of tin. I have sent your secretary, under cover to Capt. Tregay, a duplicate copy of the last report from the Mount Bischoff Mine and meeting.—*South Parade, Bath, May 7.* F. D. WICKHAM.

## NEW MEXICO—No. II.

SIR.—With regard to the partition project alluded to in my last report amongst the bondholders of the Maxwell Land Grant and Railway Company after foreclosure of mortgage, I may be permitted to state my reasons why I consider it as an opportunity which, in preference to all others, should be selected by those young men of Great Britain who intend emigrating to this continent. If healthiness of climate has any value to mortals for the short space of time they have to exist it can nowhere surpass what the pure light and dry air of New Mexico make it, where putrefaction is an impossibility. For two occupations there is in this territory all to be found whereby success—enormous success—can be attained within a very short time, and must be attained with prudent management and good energy—stock-raising and mining; but for both some capital is required, though a moderate amount will prove sufficient.

Cattle in the north-eastern part and sheep in the southern and western parts of the territory are giving excellent financial results, and are not only producing good interest, but are reproducing the capital within a few years, where the common country stock is improved to a better general standard. But for attaining good results in this branch a great deal of personal hardship and deprivation must be undergone, and the enterprise is advisable only to a number of hardy, pithy, young men who not only are content to undergo both hardship and deprivation for a time, but who are determined to keep good fellowship, so that they may form a fortress in themselves against assault from whatever side it may come. This country, like all other border countries, has its desperadoes, both American and Mexican; but on closer acquaintance with them they lose much of the vulgar incubus thrown around them. Their peculiarities consist in a desperate disrespect to law and morals, the consequence of previous evil deeds—they are courageous only where they are sure of impunity; but they are tricky and treacherous beyond description, and I never knew any of them to select a victim out of a set of men being connected in friendship unless it was out of their own kindred.

That the press of this country, together with that of Europe, have largely contributed to the sweeping disregard of law by this class of men is well illustrated by the recent fact of the same man being sent to the Penitentiary in this territory for stealing a wagon and mules whose romanticised portrait and biography was but a few months ago sent all over the world as those of a border hero as far as the German *Gartenlaube* has readers—and there is hardly any journal in existence having more at home and abroad. As there is, in fact, in these lawless characters nothing noble to be discovered with closest scrutinizing there is no danger in them where friends are together, and keep away from the haunts they select by predilection—away from gambling tables and from fandangoes, and bails. The best safeguard against all mischief for friends is always to be two together—a rule adopted by some of the so-apparently clever religious orders of the Catholic Church.

In mining the dangers and hardships to be undergone are considerably less, and the results, although dependent on a greater amount of skill and acute judgment, are as sure. But before entering on details with regard thereto I will complete my first subject—my reasons why this territory deserves the attention and preference of emigrating young Britishers before all others, and by them before any other district on this continent.

I am not a new comer in this territory, but I have been busy here for the last three years, and thus should be well aware of what its appearance to the new comer only, and of what is real fact, both being largely different one from the other in some localities. The reasons I shall have to state I select more especially with regard to

mining, this being and having been the special object of all my attentions. The first of my reasons consists in the prevalent absence of the Yankee proper in this territory. The native population is Mexican, descendants of the Spanish in ten cases out of a hundred, and of Spanish and extinct Indian tribes mixed in general. I am, indeed, very far from estimating their general and real moral standing as of a higher standard than that of the average Yankee; but they are more harmless, because, first, less energetic and reckless, and, second, more addicted still to keep up good appearances. The average Mexican desires to be considered as of some respectability. He is amicable with his compatriots, and to his employer he is as honest as is compatible with his fondness for a cigar-*tte* and no work as often as possible; but he will not play tricks with his employer and neighbour, whether Mexican or foreign, colliding with vital interests, and he will not when found out to be a rogue pride himself on it, so far as he made money by it. In fact, his way of looking at matters—allowing a place also to respectability, decency, and self-respect, and not to money alone—has some similarity to British ones, and essentially differs with the one *en vogue* with such part of the Eastern origins of this continent represented mostly in the territories.

The second of my reasons consists in the fact that in this territory, being covered to a large part by land grants of Spanish and Mexican origin, and confirmed or confirmable by the United States, mining may be carried on without the adventurer being at the mercy of Uncle Sam's immensely wise mining legislation, or of his courts of justice, so unapproachably just to the American side of the question, or without coming in contact with such amicable neighbours as will first blackmail you into the purchase of a lateral claim and into agreements full of traps and tricks, and then lawsuit you on a reverse view of the case—a one-*re-ven* theory; or who will first (Richmond, of Nevada) blackmail you, with the help of United States senators, into purchasing side claims, and into giving up half of what you honestly paid for, and afterwards manage you out of your total (Colorado Terrible). It would be no way inconsistent with previous action if the Eureka, finding that it can be defeated on its own one-*re-ven* theory would take a new issue by a side claim. Title to mining land covering large tracts may be acquired in this territory in fee-simple as real estate, which are subject to none of the United States Mining Laws, and be owned in the same way and manner and with the same security as the lords own their heritage in Old England. Not only the security of title forms the advantage in these cases; but the unimpeded authority over land, timber, and water surrounding these mines, and gives to their enterprise a basis solid without comparison before any based on mining patent for timber land, and is fit to extension and development, entirely out of question with claims limited by the foot instead of by the mile. And such rights to real estate mines may at the present time, before the railroads actually come in—although they are on the verge of doing so—be acquired for amounts trifling in comparison to what they will be in a few years hence and to what they are at present in Colorado, Utah, Nevada, or California.

The third of my reasons consists in the fact that British mining enterprise has nearly unexceptionably been successful when undertaken among the Spanish race and its descendants, wherever there at all was law in the country, and not a trifling overdose of mismanagement. As examples of such success may be quoted the Linares, Alamillos, and Fortuna Mines, in Spain; the Alamada and Triton Consolidated, Don Pedro North del Rey, St. John del Rey, Santa Barbara, Tolima, Copiapo, and Frontino and Bolivia, in Spanish colonial countries. And is it not a good evidence in favour of such enterprise that amongst the total of 39 foreign dividend mines where British capital is interested there are 10, or more than 25 per cent. of the total, situate in countries speaking the Spanish idiom—I say out of the total of all American, Australian, African, French, and German mines. This is not the result of what may be called lucky circumstances, but it is the intrinsically natural result of an affinity between the English character and that of the Spanish descendants as far as respectability in mutual intercourse and the goodwill for enterprise goes, and an intrinsically natural consequence of the nature of the title to the mines worked, and of the southern climate permitting uninterrupted operations.

While in the United States the laws governing the title to mines situate on public lands seem to be framed for the sole purpose of procuring income to the corrupt pettifoggery and shameless lawyerdom forming in this country the dominating class in administration as well as in the courts, and not for facilitating the use of natural resources—while under such law and with the corresponding administration of law, where so ample room is given for ill-usage—English capital is at the mercy of rogues. It is entirely different where either a good mining law forms the basis to build upon, as in Spain, or a good real estate title may be had to begin and proceed with, as in New Mexico and other colonies of the Spanish idiom.

After the experience English capital had in mining on United States public land in the Richmond, of Nevada, of the Flagstaff, the La-*te* Chance, and Tecoma, of Utah, the Terrible and Silver Plume, of Colorado, new investments in the same line can hardly be understood without the supposition of an idiosyncrasy in their favour. On the contrary, were not the thorn of legal uncertainty in the flesh of the enterprise from the very beginning, as it is in all cases on United States public land, the country offers advantages unparalleled by any other for lucrative enterprise.

If the Maxwell Land is partitioned there will be large tracts of mining land thus available for the production of gold, silver, copper, plumbago, and coal. Until then such tracts may be selected which were split off from the grant previous to its sale to the Maxwell Land Grant and Railway Company, because at the time they were known to be valuable deposits, the most promising and best developed one on which properties I mentioned in my last report—the Montezuma Gold Mine. It has the clear undisputable and undisputed (recognised in open court by the Maxwell Land Grant and Railway Company on April 6, 1871) real estate title, conveyed by Maxwell and wife on Nov. 19, 1869, or previous, for the sale of the total grant, the said real estate being described as follows—"1500 ft. off of the said Montezuma quartz lode, including all its dips, spurs, and angles, commencing at the Discovery shaft on said lode, and running in an easterly direction, together with a sufficient width on the surface to work said lode properly; also the right to erect a quartz mill on any unoccupied ground in the neighbourhood of said lode, with the privilege of water and fuel to work the same."

A survey made in May, 1876, proved the mine to be accessible in all its parts, there being 1275 ft. of horizontal drift and adit level, and 725 ft. of vertical shafts and winzes all in the lode, and all stopes standing, 2 ft. in average thickness of gold quartz, with the exception of very few small patches of prevalently decomposed quartz taken out and worked in the arrastres at the rate of half-a-ton per day—there being between 6000 and 7000 tons of ore in sight. All the work of development is done on the upper 750 ft. of the property. Another adit level cut in the lode would bring 300 vertical feet more to slope. The Creek and Mill site is at a distance of 3200 ft. on an incline of 25°, and a wire-rope tramway of this length would be sufficient to transport the ore to the mill site. A slate fault crosses the country overlying the lower part of the Montezuma outcrop, thus leaving its lower parts undisturbed. From a part of lode above this fault, which was cut by it below, 9258 ozs. 7 dwts. 21 grs. of gold were milled by Maxwell himself from November, 1868, to January, 1870.

If it had not been for the disturbed state of affairs consequent on the dispute of title by the United States Government, only just now settled by the ultimate recognition of the title, this mine would have found purchasers able to construct reduction works for it long ago, and it will certainly not be long in the market now, when the additional advantage of railway connection at a distance of 15 miles will bring attraction. Of undeveloped properties with a similarly good title there are several, but as yet unproven, and at greater distances from Cimarron, which eventually form good objects for extension, when success is secured on the one offering the best guarantees therefore. It remains to show why in mining the dangers and hardships to be undergone are less than in stock-raising, and the success as sure with good management.

Where legitimate work is done and mechanics and miners assem-

ble it is of common experience that the ruffian and desperado disappears. He shuns civilization, which always accompanies legitimate mining. Thus all danger from bad company disappears by the very activity of real mining and milling. As to success there can be hardly any doubt with quartz yielding \$37.50—a large average by plate amalgamation and arrastres, but showing by assays up into thousands of dollars in single samples per ton, but \$75 in the great average per ton. Colorado experience shows the cost of mechanical concentration to be \$2 per ton of plate amalgamation, and \$5 per ton of pan amalgamation (native process) to be \$8 per ton including chemicals—these being the costs under the most unfavourable circumstances, reduced to one half under favourable circumstances. The first mode fits to all gold ores, and supplementable by any of the others, or by smelting when base metal is to be had (copper is in the next vicinity) is the surest to begin with, as the concentrated ores can be shipped to and sold in California, where there is great competition for it; and as soon as the character of the product is well established, and the best mode of reduction settled, these dressing-works will always be the most economical preparation of the ore for reduction, reducing the work for handling and treatment at the total rate of concentration. With these works and cheap mining quartz of \$10 yield may be profitably worked, of which there are immense deposits in the same district; but with a lode yielding like the Montezuma the limits are not so close, and success is as well guaranteed as with stock-raising.

F. M. F. CAZIN,  
Consulting Mining and Civil Engineer.

Bernalillo, New Mexico, April 10.

## NEW QUEBRADA COMPANY.

SIR.—In accordance with the instructions received from the shareholders, whom we represent, we beg to state to our friends that our efforts to obtain an interview with the directors have been unsuccessful, as they prefer to reply to the questions of detail on which we wished to be informed at the general meeting of shareholders, and it will be seen from the annexed copy of our letter to the directors that our communications with them on this subject are closed. Our friends will, therefore, have to obtain the required information at the meeting, and if we can assist them then or otherwise to bring about a more satisfactory condition of affairs, it will afford us much pleasure.

W. W. BIRD,  
ROBERT LORIMER,  
J. H. RITCHIE.

Great Winchester-street, May 9.

[COPY.]

TO THE CHAIRMAN AND DIRECTORS OF THE

## NEW QUEBRADA COMPANY (LIMITED).

GENTLEMEN.—We have received your letter of yesterday's date, declining to grant us the interview we have requested, and we shall so report to our constituents. Of course we shall endeavour at the general meeting to obtain all the information we want, and with that view we have to request that the books of the company be produced at the meeting which you say will be held on the 30th inst.

W. W. BIRD,  
ROBERT LORIMER,  
J. H. RITCHIE.

Great Winchester-street, May 7.

## NEW QUEBRADA COMPANY.

SIR.—You perhaps will allow me to make a few observations upon Mr. Brenton Symons's letter in the Supplement to last week's Journal, advocating the erection of Castilian furnaces for the reduction of copper ores, and giving details of the cost of smelting by that process at Maidanpek during 1877, together with the cost of charcoal making.

Accepting Mr. Symons's statement that the ores of the Servian Copper Company and Quebrada are analogous in character, and I presume of about the same value, I find the first matte produced contains only 20 to 22 per cent. of copper; from this I suppose the ores had not been previously calcined, except such as they might get in passing through the oven, thus involving in this operation an unnecessary consumption of fuel, and producing a bulky regulus of low quality. There appears to me to be several inconsistencies in the various statements made, but which no doubt only require pointing out to be satisfactorily explained by Mr. Symons.

Mr. Symons says that if an excess of sulphur is avoided a furnace will run from four to six weeks before requiring repairs, and it then takes three or four days to restate, and that the cost for such repairs during the whole year was only 38*l.* 6*d.* per furnace, inclusive of all labour and materials. Now, suppose we allow the furnace six weeks for working and repairs, and a further four weeks during the year for stock-taking and other stoppages, we shall then have the furnace wanting repairs eight times during the period named; the average cost, therefore, each time is only 4*l.* 9*d.* 4. How can the labour of the men alone (say nothing about materials, &c.) doing these repairs during the three or four days required be paid out of such a small sum? In the list of smelting charges Mr. Symons gives the cost of reinstating furnaces as 1*l.* 0*d.* per ton of ore. Now, taking the half only of this item as the share to be borne by the ore oven, and calculating upon (say) 5 tons of mineral passed through the same each working day of 24 hours, the charge for repairs assumes a very formidable character. Such an oven oven requiring the labour of four men and two boys, consuming 1½ ton of charcoal, and reducing 5 to 6 tons of ore every 24 hours, cost at Maidanpek during 1877 2*l.* 6*s.* per working day; therefore, taking the quantity of ore as 5½ tons, the smelting charge amounts to 8*l.* 4*d.* per ton, but in the list of charges Mr. Symons puts it down as 13*l.* 2*d.* 4. Taking off the cost of charcoal at 19*l.* 5*d.* per ton, there remains but 12*l.* 0*d.* 4. to pay wages and other costs.

Roasting the matte four to six times in heaps in the open air is put down at 8*d.* per ton of wet ore. Now, as this matte only contains 20 to 22 per cent. of copper, it must amount to a considerable weight, and after the first burning will require considerable quantities of fuel of some sort to supply the necessary heat for proper calcination, in addition to which it must be moved each time; it seems to me incredible that all this can be done for so small an amount. The charges for officers and overseers 1*l.* 2*d.*, and laboratory 2*d.*, are extremely low, as are also the other items, whilst there is nothing put down for rents, rates, taxes, interest, depreciation, &c. I must confess that, having considerable experience of the work to be done, and making full allowance for the lowness of labour in Servia, I do not at present understand them.

The price of charcoal, 19*l.* 5*d.* per ton, is low, but I see nothing is charged for the timber used in its manufacture, and I suppose the Servian Copper Company must have purchased these woods at some time or other, therefore something should be debited for this purpose. Knowing something of the cost of making charcoal in Bohemia and other countries, I must say that this price of 19*l.* 5*d.* is the lowest I have yet heard of.

The low cost of the erection of these Castilian furnaces, only 35*l.* each, is no doubt attractive, but I question if they can be built out of Servia, where everything appears to be so remarkably cheap for anything like the same sum, and I presume a proportion of the cost of erection of motive power for producing the blast, blast machines, main blast tube, and connections and so on, must be added to this figure. I believe these Castilian furnaces to be quite unsuited to a country like Venezuela, where the cost of fuel is high, and labour scarce and expensive. The first outlay would be heavy, as very many such ovens and furnaces would be required to meet the quantity of ore raised at Quebrada, and to deal with the large quantities of low-grade ore which I understand are lying about the mines, involving an amount of labour which I do not think the country could supply. The small quantity of ore raised through such furnaces is not at all commensurate with the excessive consumption of fuel and the large amount of labour required, and I believe the smelting loss will be found to much exceed 0.35 per cent. of copper.

I am not averse to the smelting of poor ores in the blast-furnace, but such a cupola should be erected as would treat at least 50 tons a day, and it should have an arrangement for collecting the waste gases, to be applied in heating the blast, whereby a very considerable saving of fuel would be effected. Two smelters, and six, or at the outside eight, ordinary labourers would amply suffice to work this furnace, including the preliminary roasting of the ore in heaps, whereas 54 men and boys and nine furnaces would be required to do



the same work by the Castilian process. The consumption of fuel would be about half, either charcoal or coke, and even raw coal or lignite, which I believe is found in Venezuela, could be used. The repairs and all other charges would be considerably less, and ores of a much lower produce than 10 per cent. could be profitably treated. For smelting the richer ores in Venezuela I believe no system would be equal to the regenerative gas furnace, because it will burn as fuel with good results either coal, lignite, peat, wood, or even sawdust. Such a furnace would easily smelt 12 tons of ore in 24 hours, upon a consumption of wood represented by the 1½ ton of charcoal required to heat 5½ tons in the Castilian ore oven, with half the number of hands, and with much more satisfactory results in every way.

There can be no doubt of the importance to the Quebrada Company to reduce their ores on the mines to a moderately rich regulus before sending them to Swansea for sale, but I certainly think this would be effected much more satisfactorily by the means I have advocated above than by the Castilian method of Mr. Symons.

Smelting Works, Ripley, Derbyshire, May 8. C. BOUNDY.

#### MINING IN THE EAST—No. XXX.

##### CONTACT DEPOSITS OF THE BANAT.

SIR,—MOLDOWA MINES: The Moldowa deposits from the most southern district in the Banat, and lying amidst the accidented slopes of syenite, schists, and limestone, which extend from the Szaska plateau to the banks of the Danube, present many minor features which distinguish them from those surrounding the banatite at Szaska, Oravica, and Dognaska. The syenite disappears under the limestone and metamorphic has a little to the south of Kohldorf, and lies concealed for a distance of about three miles, when it again comes to the surface at the head of the Moldowa Valley, and is found extending to the Benedict Gebirg in several minor patches, which owe their exposure to the denudation effected during recent times by the affluents of the River Bosniak. Therefore, are these minor exposures attended by deposits of only inferior magnitude and value, whilst the syenite of the Benedict mountain, whose superior bulk and elevation is due to the greater energy of the plutonic action, is encompassed on all sides by enormous contact formations, with which are associated those large accumulations of cupreous pyrites, whose extraction and reduction have sustained during so many decades a population of 3200.

The chain of eruptive bosses ranges parallel throughout its meridional extension to the crystalline schists on the west, to whose close contiguity may be ascribed the formation of the several quartzite masses, which cluster about the line of surface demarcation between the limestone and the schists. The contact phenomena presented by the mechanical and chemical reactions of the syenite and limestone on each other, are taken as a whole, analogous to those exhibited around the other plutons. Thus the calcareous beds have in some places been transformed into compact or earthy garnet rock, and everywhere near its contact with the eruptive matter has for a little distance acquired the appearance of marble. The fringe of gangues which accompany the junctions throughout most of its extent attains occasionally a breadth of 80 fms., and is variously composed of quartz, calcite, kaolin, aluminous substances, and compact garnet rock; crystallised garnet or tremolite is of rare occurrence. In no part of the Banat are the deposits of cupreous ores so abundant as those which, mantling around the syenite of the Florimund and Benedict mountains, have surrendered to the picks of the miner during the past century not less than 7000 tons of copper. The pyrites are both magnetic and martial, and are found disseminated everywhere through the gangues, and concentrated in immense masses along the junctions of the central formations—i.e., with the syenite on the foot walls and the limestone on the hanging walls.

Notwithstanding that these mundies rarely exceeded two parts of copper in a hundred, they were continuously mined up to the Revolution in 1848, during which year the reduction works were destroyed by a filibustering expedition, composed of an uncivilised herd who crossed over from Serbia. Small as was the percentage of the surface ores, it diminishes rapidly towards the deep. At the time of the Revolution a large proportion of the ores supplied to the furnaces did not enclose more than 1 per cent., so that, notwithstanding the remarkably low price of labour and cheapness of charcoal, the copper produced was scarcely sufficient to meet the expenditure. On cessation of the revolutionary troubles the works were reinstated, but the rise in wages, coupled with the miserable produce of the mineral extracted, occasioned a continuous loss on the working, and after languishing until 1871 the copper mines were finally abandoned. The average amount of fine metal produced from 1857 to 1871 was only 15 tons per annum, and to separate this quantity it was necessary to pass through the furnaces from 1200 to 1500 tons of cupreous pyrites mixed with some oxides. As in the other districts the sulphides have been changed into hematite, though only to a small depth, and correlatively the copper set free has been deposited in lower positions in the form of oxides, which on the hanging wall penetrate to the level of the drainage, but next the syenite are found only to a small depth, and of little value.

The banatite of Moldowa is commonly greenish-grey in colour, and but little, if any, quartz enters into its composition; it is either finely granular or compact, enclosing numerous small crystals of albite, some thinly dispersed plates of dark mica that rarely increase the hexagonal columns, and but very little hornblende.

The plan attached has been reduced from the official plan deposited at the Central Bureau of the States Railway Company.

##### MOLDOWA MINING DISTRICT.



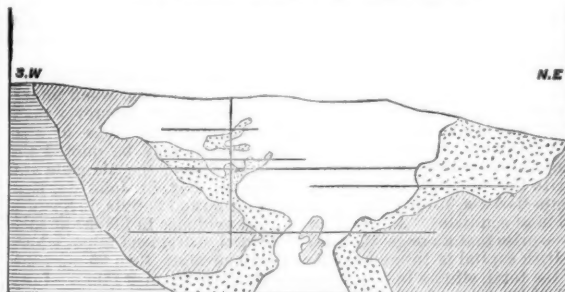
- Scale—700 fms. to an inch.
- L.—Metamorphic liss.—O.: Oolite.
  - Crystalline limestone is shown by diagonal lines.
  - Crystalline schists by horizontal lines.
  - Quartzite rock by crossed diagonal lines.
  - Gangart by fine dots.
  - Syenite or banatite, white.
  - Metallic deposits, black.
  - B.—Basalt dykes.

The small patches of syenite which have forced themselves between the limestone and schists at the northern end of the district, where the River Bosniak takes its rise, is barren of deposits, and no ores of any value could have been obtained from the insignificant workings made by the old men in the traces of gangue which rarely show themselves along the junction.

The central mass, known as the Almasch Mountain—has developed on its eastern junction a large mass of gangue, which contains copper mundie. At its contact with the syenite the limestone has been metamorphosed into hard crystalline rock, in which wander numerous shallow clefts and fissures anciently exploited for argentiferous galena. The syenite which forms the bulk of the Andrias mountain is very tortuous, and surrounds several fragments of lime rock, but the quantity of gangue is not great. Between this eruptive rock and some irregular masses of quartzose rock to the north is a mine named Krenitschan, which was opened to explore some small veins in white marble, containing argentiferous galena and grey copper ore; along the junction a few small deposits were mined for oxides of poor produce.

The deposits of the Florimund Gebirg have been extensively worked along both the east and west contacts, and have yielded oxidised ores of copper in sufficient abundance, but poor in quality. The sulphides of iron were most concentrated contained 3 per cent., but being usually much mingled with gangue the average produce of the deposits was only equal to about a hundredth part of copper. The accompanying section is of great interest as illustrating the manner in which the eruptive matter poured through the disrupted masses of limestone, and thrust itself in considerable masses over its surface. The reaction of the syenite on the calcareous beds thus partially surrounded was doubtless intense, and elaborated the extraordinary gangues found on each flank of the dyke-like eruption, which, commencing at the Florimund Mountain, retains the same character throughout the whole length of the Lilescher and Benedict Gebirg. The associated gangues are composed principally of quartzose and aluminous matter, which is throughout so besprinkled with iron pyrites as to be considered a component part of the rock. The mundie is found very unequally distributed, and it is only in those portions where the mass consists of nearly pure pyrites that copper ores not exceeding 3 per cent. were extracted. Near the surface these pyritous ores become oxidised into hematites and brown earths, whilst the liberated copper has been deposited in the forms of sulphates, carbonates, and oxides on the limerock. A course of pyrites some 70 fathoms in length was exploited for copper mundie in the Florimund Gebirg, but is now exhausted, and the mundie now raised, containing only ½ per cent., is used in the Moldowa Chemical Works. It was observed that when some magnetic pyrites became mixed with the martial the produce in copper was higher.

##### CROSS SECTION AT FLORIMUND GEBIRG.



- Scale—50 ft. to an inch.
- Limerock, diagonal lines.
  - Gangart, dotted.
  - Schists, horizontal lines.
  - Syenite, white.
  - Deposits, black.

There are no mines of modern date in that portion of the district known as the Lilescher Gebirg, which forms a connecting link between the mines of the Florimund and those of the Benedict Gebirg, but numerous old burrows and pits show that the Lilescher mountain was in former days extensively exploited. The syenite is here divided by two parallel dykes of basalt, which were evidently opened before the formation of the gangue, because they do not protrude themselves beyond the eruptive rock. The syenite of the Benedict Gebirg appears at the surface in two narrow dykes, accompanied by gangues of enormous width, which are analogous to those of the Lilescher and Florimund Gebirg, but enclosing also some granat. The iron pyrites diffused throughout the gangues is slightly cupreous, and is most highly concentrated near the syenite, where it is occasionally found rich enough in copper to be worked. These pyritous deposits are also worked to supply the sulphuric acid works at Moldowa. At Bleiberg, near the southern extremity of the syenite, the Amalia Mine which produced silver-lead, and in a gangue isolated in the limerock, a short distance to the south of the point of syenite, some veins containing oxides of lead were worked.

A mile and half to the south of Bleiberg another eruption of syenite appears through the limestone in the form of a dyke some 1200 yards long, attended on both sides by narrow gangues, similar in composition to those above noticed. It is not known if deposits exist in this mountain, which has received the name of the Warader Gebirg. Copper mining has long ceased in this district, and the few miners remaining are employed in raising the iron pyrites required for the manufacture of sulphuric acid, and in working a deposit of manganese which, enclosed in a narrow vein between limerock and syenite, yields a rich ore containing 70 per cent. of manganese oxide.

It has been impossible to obtain statistics of the production of the metals prior to the revolutionary disturbances. From 1857 to 1871 inclusive 233 tons of copper only were produced, and of lead 13½ tons, which contained, however, 2747 lbs. of silver. EMPRESSARIO.

Vienna, March 3.

##### DON PEDRO GOLD MINE.

SIR,—I have read with interest the letters of "Mentor" and Mr. Houston in last week's Journal with reference to the Don Pedro Gold Mine, and as I have some knowledge of the mine I can corroborate "Mentor's" remarks. Mr. Houston has evidently been misinformed about the permanent pumping machinery. I saw it on the property about seven years ago, and I also know that it was far advanced towards completion, and was being rapidly pushed forward by Mr. Manders when the managing director visited the mine six years ago. Soon after the managing director returned to England another manager was sent out, and he called in to his assistance the principal talent of the richest mine in Minas Geraes, and after carefully going into the matter they decided that the permanent pumping machinery was unnecessary, inasmuch as by patching up Dawson's wheel and by bringing the water on to the top of the wheel instead of 2½ ft. below the top as before, it would enable them to explore the mine to a further depth of 30 or 40 fms. The consequence was that the erection of the permanent pumping machinery was suspended until taken in hand by Capt. Vivian about 15 months ago, and it is a mistake to say the delay was caused by scarcity of timber and labour. If, as Mr. Houston states, it only requires the completion of this machinery in order to resume the payment of large dividends, it casts a sad reflection on the whole of the executive since the time when Messrs. Treloar and Simmons were the managers. It was under the management of these gentlemen that the Don Pedro paid in dividends over 220,000£, but since they ceased to be the managers about seven years ago the mine has been working at an actual loss, although in the interim they must have raised 400,000 or 500,000 oits. of gold. I believe with Mr. Houston that the Don Pedro is still a very rich property, but I believe also that if the management had continued throughout the same as it was up to 1871 fully half of the gold that has been taken out since that time would have been paid to shareholders in dividends, and the Don Pedro would now be in a flourishing condition. I attribute a great deal of the failure of the Don Pedro to the frequent change of

managers. Scarcely any of the managers had ever seen a jactating mine previous to their arrival on the Don Pedro Mine, and before they had completed their first lesson in mining they were superseded by some one perhaps more inexperienced in mining than themselves. If companies persist in a course of this kind they must not be surprised if the most promising concerns prove a failure. As will might you place an ordinary miner in command of a fleet as placed a person with no mining experience in charge of an extensive mining property like the Don Pedro. The present manager of the Don Pedro has the reputation of being a good miner, and I should advise the company to stand to him, and second his efforts in every way in their power if they wish for success. I know the property well, and I would advise all those shareholders who have stuck to it in their adversity to hold on their shares, as with judicious management there is a bright future before them.

Truro, May 6.

A CONSTANT READER.

##### DON PEDRO NORTH DEL REY (GOLD).

SIR,—I have read with much interest the able letter of your correspondent who signs himself "Mentor," in last week's Journal, and duly observed his remarks on my letter which appeared in the Journal of April 13. Controversy elicits truth, and also information. "Mentor" makes no allusion to the fair profit that was shown for the month of February, even after paying the monthly cost of the erection of the pumping machinery. The produce for the month of March (4500 oits.) was, I admit, insufficient to clear expenses, and for that month a loss must necessarily be declared. In these times a little *coulour de rose* is indispensable to attract attention, and I am pleased that the object I had in view—the bringing before the notice of mining adventurers the merits of this property—has, through the powerful medium of the Journal, been attained. I do not wish on this occasion to enter into any extraneous details, but will simply give you a few extracts as some authority for my conclusions. They are from a circular issued to the shareholders dated Nov. 23, 1876, and are as follows:—"Capt. Vivian strongly urges the completion of the permanent pumping machinery, which, with sinking the sump-shaft and new hauling shaft, and driving cross-cuts to open out the several lodes, will entail an outlay of, probably, 15,000£. Captain Vivian himself goes on to say in the circular. "I am fully aware of the responsibility I take in urging you to give consent to put up this machinery, but can assure you that could I not see the great advantage to be obtained thereby I should in like manner be as frank with you as when reporting unsatisfactorily on first examining the mine. On working the mine and opening out the different lodes I found the productive parts to increase in width and thickness, and also the value of the ore much improved, therefore that justified me in saying that the mine will pay for the outlay named, and return profits to the shareholders." I might go on with still further extracts, but I dare not trespass on your space. The foregoing, however, are, with other and later information and reports, the data for my assertions. The machinery has been completed, no call has been made, a handsome balance still remains at the bankers, and there is a reserve of uncalled capital closely approximating 20,000£. Capt. Joseph Vivian, who has had long experience in the development of jactating mines, has proved himself the right man in the right place, and under his superior discernment, judgment, and skill the Don Pedro will, I believe, realise the most sanguine expectations. In conclusion, I hope "Mentor" has not been "bearing" the shares, as they, it appears, will have a great and rapid rise.

Crosby Hall Chambers, May 10.

JOHN S. HOUSTON.

##### RICHMOND MINE.

SIR,—May I suggest to the directors in sending out their forthcoming report and balance-sheet to accompany them with a plan of the mine? In a large concern such as the Richmond Mine, with its complicated underground workings, and part of the ground in dispute, the possession of such a plan by the shareholders would prove very useful for reference, and enable the weekly reports from the mine to be more intelligently understood. A SHAREHOLDER.

City, May 8.

##### COMBAMARTIN AND KNAP DOWN MINES.

SIR,—In amplification of a paragraph on Old Combmartin Mines in last week's Journal, I may state that the 28 west is within a very few fathoms of the same caunter lode, very quickly expected to be cut in the cross-cut adit level. As the 28 west improves in nearing this caunter a material improvement may occur at the junction, inasmuch as at Knap Down Mine adjoining, under exactly analogous circumstances, 5000£, to 7000£ of ore was very rapidly raised. This ore was only 10 fathoms under adit, not so deep, therefore, as Old Combmartin in the 28. This Knap Down ore was unexpectedly discovered, and when a general meeting being nearly due anxiety elicited a more careful observation of the surroundings of the lode, and with this pleasant result. Present Old Combmartin caunter lode produced several tons of silver-lead ore in the working of 1855, proving the ore-producing capabilities of the lode, and further east lumps of good ore have been taken from the back of this lode. The present cross-cut adit will shortly cut this lode 20 fathoms deep, close east of a junction with an east and west lode—a most favourable feature. The present cross-cut could turn house on the caunter, towards the present 28 west, carrying backs of upwards of 30 fms., and besides discovering ore would effectually ventilate the mine west. The cross-cut north would come under the lode in the 28, just where ore is now discovered in the 15 east, and have 35 fms. of backs, as stated by your correspondent, cheaply removed. This ore in the 15 east is 10 fathoms behind the ore found so strong in the back of the lode in the lane, and augurs good ground existing between these points. The cross-cut will cut out other lodes, and ventilate eastward, enabling the mine to be worked effectually, with little cost, and probably soon to a profit. The late Capt. William Trelease, agent of Messrs. John Taylor and Sons, considered these caunter lodes would be as productive as Old Combmartin Mine itself. It is not sought to overpraise the present prospects of the Old Combmartin Mine, but simply to place bare facts before the public to judge if the shares are not worth securing at the present low prices, as in Knap Down shares rose rapidly under circumstances named from 3s. to 3½, and Old Combmartin having the advantage of working with machinery. OBSERVER.

Combmartin, May 8.

##### PARACOMBE SILVER-LEAD MINE.

SIR,—A few days since I paid a visit to this valuable sett, and, probably, the following notes will interest those of your readers who have taken an interest in the property, as well as those who are about so doing. I was particularly struck with its beautiful situation, being in the southern slope of the hill, and offering such advantages for driving on the course of the lodes as are but seldom met with. The geological character of the strata is all that can be desired for the production of silver-lead, whilst the numerous lodes, and their length of over 200 fms., show most clearly the ample extent of the mineral resources at the command of the company, and this is an important consideration in connection with the success of any mine. The excellent stream of water running through the property is an advantage not to be overlooked in estimating the probable profits of the mine, as here the saving of capital which is usually expended in steam-power will most materially increase the percentage of the dividends, which I predict will not only be large but also an early result. Since my last visit a cross-course has been intersected in the adit driven on the course of No. 1 lode. At this point the lode is not only wider, but also richer, a very promising indication for the future. Altogether this is a well defined and masterly lode, and as an extra staff of men are put to work at this point I fully expect ere long to hear of good results. No. 5 lode, on the south side of the stream, has a most promising appearance, it is composed of beautiful gossan, quartz, and stones of lead ore; it is from 3 to 4 ft. wide, and by extending this adit west backs of 30 or more fathoms will quickly be gained, and from its appearance I believe large quantities of lead ore will be met with. Judging from



prove a valuable and masterly one. From this point also I brought away some good stones containing copper and lead. After an inspection lasting over three hours I drove back to the station, with the conviction most strongly confirmed in my mind that ultimately the Parncombe Mine will rank as one of the most prosperous ones in the county, and that the company may fully expect to meet with the rich reward they so well deserve.

R. J. RUTTER.

Exeter, May 9.

## MINING IN CARDIGANSHIRE—TYN-Y-FRON MINE.

SIR.—Would you allow me to occupy a short space in the Journal to inform the parties interested in this property that there is now lying broken on the mine the best lots of blende and lead ores awaiting manipulation that it has ever been my lot to witness in Cardiganshire, and the places for deposit have become so filled that it is high time the machinery for crushing and dressing should be set on foot? I am informed on the best authority that contracts for the erection of a powerful water-wheel and crusher are being entered into, as well as for the providing and erection of the requisite self-acting jiggers, buddles, &c. A short time would suffice to do all this, as the water-courses from the River Rheidol on to the proposed dressing-flooring have all been cut, and the launders for crossing from the south bank to the north bank of the Rheidol were paid for and completed. This must become the first great permanent dividend-paying mine in the county as soon as machinery is erected. It would be a great blessing if West Cwmystwith and New Tyllywyd Mines, which Capt. Francis alleges to have been so mismanaged, were the only ones, but alas their name is legion, and the sooner parties interested in Cardiganshire mines and mining bestir themselves the better for them. That the mines of Cardiganshire are destined to have a bright future before them to my mind admits of no doubt.—Cwm Darren, May 7.

ANDREW WILLIAMS.

## LEAD MINES IN THE NORTH—WEST PATELEY LEAD MINING COMPANY, &amp;c.

SIR.—I have read with interest the information communicated by your correspondents as to the position and value of these mines; but, as far as I have seen, the most complete description of them has not yet appeared in the columns of your valuable Journal. It was written, I understand, by one who has had many years' experience in mining, and who is now introducing influential capitalists into the district.

In the true carboniferous formation—says this well-known writer—where such enormous wealth has been found in the surrounding mines, the value of the 14 well-defined lodes and several cross lodes traversing the length and breadth of the property, there is every reason confidently to expect that West Pateley Lead Mines cannot fail to prove a success equal to the Grassington Mines, which have paid to the Duke of Devonshire profits of from 60,000L. to 70,000L. per annum! Among many other authorities, Mr. Frank Phillips (the lord's mineral surveyor) says:—"From my first knowledge of these mines I have viewed them as of great value. Looking at the surrounding mines, all of which have yielded large profits, I do not look at the West Pateley Lead Mines as a speculation, but rather as a certain success when fairly opened up."

When West Pateley Mines were last worked (1790), and yielded large profits, the royalty was 1-6th, it is now only 1-14th. Cals had to be carried from a long distance at a considerable cost; now pumping machinery is unnecessary—a most important fact. Pig-lead then sold for 10L. per ton, whereas it now realises about 17L. The lead ore averages about 75 per cent. in pig-lead; including fuel, labour, &c., the cost of smelting does not exceed 22s. per ton. Then there was no railroad within 17 or 18 miles, it is now within 3 or 4 miles. The works now in active progress are—Craven Cross Vein: The 56 ft. level has gone over a course of lead ore 120 ft. in length, and continues in the extreme end approaching the perpendicular of the former workings. According to all the information that can be obtained in the district, extensive and rich ore bodies were discovered here when the mines were last worked, in 1790. As far as exploration, these workings show that the "ancients" unprovided with efficient mechanical appliances, were able to remove only the soft portions of the lode, leaving (even in these present excavations) large quantities of valuable lead ore, that can be readily raised to surface, yielding a good profit; moreover, it is now known that in this section of the mines there has been already discovered a course of ore 120 ft. in length, and how much longer future explorations alone can demonstrate, as about 50 fms. remain to be driven (under these workings) before the Craven Cross shaft is reached. Beyond this shaft, northward, the company owns an extensive area of ground, which has within it a network of valuable mineral veins. For centuries past in the contiguous mines these veins have yielded fabulous riches. Within 40 or 50 fms. of the shaft this series of veins will be reached, and the limestone measures being overlapped by shale renders it as great a certainty as possible that a considerable accession of mineral wealth will be developed in this ground.

North Rake Vein: Upon this historic vein No. 2 shaft has been sunk to a depth of 30 fms., the ore body gradually increasing in value, and to use the manager's own words, "is richer and stronger in the bottom (or sole) than at any point yet seen." Laterally, too, this rich vein is proving to be of considerable extent and value. No. 2 shaft is sunk to 30 fms. deep; opening out the North Rake vein at this increased depth is a point of great importance, when it is known that the lode has gone down "richer and stronger" in the bottom of the 20 ft. level.

New Discovery Vein: A shaft has been sunk on this vein to a depth of 10 fms., yielding rich ore. A cross-cut will be put out to this New Discovery vein. Here also, judging by the matrix no less than by the quality of the lead this vein has already yielded up to surface, there is every reason to anticipate considerable wealth will be discovered, if, indeed, it does not open out in itself a valuable mine.

Langthorne's Vein: So called because a family of working miners of that name, some years ago, obtained from it lead to the value of 12,000L., although working the vein to a very limited depth on account of being unable to cope with the water. This difficulty has been permanently removed by the joint adit (56 fms. deep). From this level a cross-cut will be driven under the rich shallow workings. Inexpensively and rapidly will this exploration be carried on, and the result cannot be overvalued. During the progress of these several horizontal explorations many of the other veins will be intersected before reaching those for which the works will be mainly prosecuted. Obviously it is quite impossible to even approximately compute the amount or value of the "reserves" of lead that will be rapidly laid open as these operations are carried out. Certainly the valuable discoveries already made are ample enough, irrespective of the tangible proofs of augmenting wealth, to form a well based opinion that the West Pateley Lead Mines cannot fail to be a great prize. Between 40 and 50 miners are employed underground; and every work is up in a scale commensurate with the requirements of an extensive mine, which this undoubtedly is, as its area is  $\frac{1}{2}$  mile square, with 13 or 14 proved masterly veins, besides numerous cross-veins—one of the most valuable features of the property.

At the productive points the lodes are very soft and easy to work, and the lead being almost pure requires little or no dressing, and the associated minerals assist as a flux in smelting. The ore is smelted by the company itself. The pig-lead is sold on the spot for cash, whereas in other districts the ore has to be sampled, trucked, shipped, and paid for in three or six months' bills. These facts show that there are few mines capable of such developments, or will so surely yield profitable results upon a small expenditure. The crusher, dressing-floors, and other necessary surface machinery has been erected, so that regular and increasing returns will henceforth be made.

According to the official report, which I see appears in the Journal of Saturday last, a further improvement is recorded, the manager stating that in the veins sinking below the 56 ft. level "we have a splendid vein, increasing in size and value as we get deeper; at present 4 ft. wide, between two well-defined walls, and carrying good branches of galena on the north wall." As in the adjoining mine, at a depth of about 100 fms. one of the lodes yields variably from 3 to 8 tons of lead ore per fm., and the present deepest point in

the appearance of No. 2 lode, I believe this on being opened up will West Pateley is 60 fms., need any surprise be felt that those interested are being daily convinced that their property is destined to be the vanguard of the successful lead mines in the North?

Leeds, May 8.

J. E. HARRILD.

## DEVON GREAT CONSOLS.

SIR.—The readers of the the Journal in the West are surprised and pained to find the information furnished the Journal—on which the articles recently published on the above mines are based—should have been so groundless and untrue. The men who for years past have worked in Devon Great Consols were, for instance, amazed to hear the statement in last week's Journal with regard to the monthly returns of the mines. In various places throughout the workings they state they really break as much arsenic as copper ores, and on their way to and from their work they pass the largest arsenic manufactory in the world supplied entirely from the raisings of Devon Great Consols; and yet they hear it is published in the Journal that scarcely any importance whatever is placed on this, almost the principal product of the mines. They state they consider the arsenic made for a very long time past is worth as much as the copper ores, and they assert that from 200 to 300 tons of refined arsenic are manufactured monthly at the mines, and that some thousands of pounds worth are now packed away in every available store on the mine. It is to be regretted that unfounded reports should be spread abroad, and no attempt made to furnish the Press with an idea of the magnitude of the workings of the mines. The distress caused in the neighbourhood of the mines can be now better understood; it is not a small matter that upon so trivial a dispute as to whether the men shall be paid by the calendar or the lunar month that so large a works should be thrown idle, and gloom and desolation cast over the whole district.

X. Y. Z.

## DEVON CONSOLS—TWELVE MONTHS' PAY DAYS.

SIR.—From the numerous opinions I have heard expressed—not only by mine agents, miners, and some of, I believe, the largest shareholders—there is no doubt but the board of directors have taken a very wise step to have only twelve monthly pay days instead of thirteen pay days. These are not times for miners who get 52 weeks' pay for 52 weeks' work to dictate to the directors or shareholders whether they shall be paid thirteen or twelve times in the year. It is, also, purely a question between the employer and employed—the shopkeeper, or tradesman, or anyone else, has no right to dictate how the men shall be paid—and I, as well as many others I know, think it a great piece of impertinence to see "X. Y. Z." and other anonymous correspondents, writing about what does not concern them. Your powerful remarks contained in last week's Journal in support of the twelve monthly payments are quite to the point. If the men will not at once go to work on the twelve monthly pay days, then the directors should at once get others to keep the pumping-engines at work, and cease working until a better price can be obtained for copper ore, as the present low prices leave such a serious loss. Boring machinery could easily be got to drive certain levels at 25 to 30 per cent. cheaper than by hand labour, and get three or four times the work accomplished monthly. There is no question, as you point out, but that the radical change in the local management of these extensive mines requires to be, and must be, made if the directors and shareholders will only look well into matters. I feel convinced that a saving of many thousands of pounds annually can be made on surface management alone. Many shareholders' shares, it should be remembered, cost them 350L. to 400L., and even 500L. a share—i.e., about 35L., 40L., to 50L. of the present shares; and yet they are only marketable at about 3L. each, and only one small dividend during the last six or seven years. Do the agents, or miners, or anyone else in or around the mines think for one moment that these shareholders will pay calls simply for philanthropic motives these unprecedentedly depressed times? Surely not. I have good reason to believe that those employed at Devon Consols are very much better paid for work done (or supposed to be done) than in the West of Cornwall and many other mining districts. Indeed, as Mr. Symons honestly wrote last week and showed that there are 500 men ready and would only be too thankful to get work at Devon Consols, and at greatly reduced rates of wages, and on the twelve monthly pays. From information already come to my knowledge three-fourths at least of the largest shareholders have acquiesced in the just steps taken by the directors, and will not only support them in this but in whatever may be considered for their interests.

From enquiries made we find that the working for March month (four weeks) ended on or about March 23, measurements having been taken of work accomplished and the accounts made up, the men were paid on April 20. Now, supposing this March month what it would have to be under the twelve pays—a five-weeks month—the working would have combined another week—i.e., until March 30, and the pay-day would have been a week later, April 30. In other words, the miner would have had to take up five weeks' pay on April 27 instead of four weeks on April 20. Where is the hardship to the men, or any injustice? None whatever. If the men will not work on these terms let them be forever shut out, and let others take their place—the sooner the better.

A LARGE SHAREHOLDER.

City, May 6.

## DEVON GREAT CONSOLS, AND THE FIVE-WEEKS MONTH.

SIR.—As an old correspondent of the Journal for upwards of 30 years, I have taken some considerable interest in the recent controversy in reference to the question of labour and the superintendence of the operations of the above celebrated mines. The subject of the five-weeks month may, I imagine, be confidently left in the hands of the company, as from a long public experience of the general conduct of their arrangements no fear need be entertained of their deviating from their established principles of honourable dealing towards the men in their employ, nor from the general rules of legitimate mining adopted throughout the mines in Devon and Cornwall. In the heat of the present controversy, as in times of election and other periods of excitement, matters have cropped up which have really no actual bearing on the question at issue, but which are, nevertheless, apt to cause unnecessary and uncalled for uneasiness to many whose individual positions should be left entirely out of the question. The remarks on the position of the agents of these old-established mines in the present instance a foolish illustration of this fact; and, with your permission, I will make a few practical remarks thereon. The amount named in the Journal for salaries, although it might appear high in a mine of ordinary extent, does not on investigation really reach the total that might reasonably be calculated upon in mines of such magnitude as the Devon Great Consols. The number of agents given in the Journal includes, it may be presumed, the whole of the staff throughout the mines. Taking, then, the manager of the whole of the operations, the superintendent of the arsenic manufactory (which is represented as being the most extensive in the kingdom), the principal accountant, and the chief underground agent, these four responsible officials could not be reasonably expected to serve the company for a remuneration at all less than half the amount named in the Journal. The other agents will comprise the underground agents throughout the mine night and day, dressing agents, dialer, clerks, &c., in connection with the different mines comprised within the boundaries of the establishment, and which, from the published reports, are named Wheel Maria, Wheel Fanny, Wheel Anna Maria, Wheel Josiah, Wheel Emma, and—as well as I remember—Wheel Thomas, a mine some years since of great promise, and yielding fair returns.

In an establishment with which I happen to be acquainted yielding returns considerably less than 40,000L. a year—which I take to be about the returns of Devon Great Consols—the proprietors compensate two of their chief superintendents (who have no underground dangers to encounter) by a payment very nearly equal to that of the whole of the Devon Great Consols agents placed together. The salaries of mine agents in general, and it would seem of Devon Great Consols agents in particular, are not higher than they were 40 years ago, when a golden guinea was equal in value to very nearly 30s. now. The mine agent is about the only man of respon-

sibility and position whose compensation for services rendered has not gone with the advance of the times.

VINCE.

May 9.

## THE FIVE-WEEKS MONTH.

SIR.—Some years since my men, children, and shopkeepers convinced me that paying every fortnight would be a blessing; I was convinced, and adopted it. Day-book made up to Thursday night; tutwork measured on Friday; and tributers' ore guessed on Friday and Saturday morning, and paid on Saturday, at 12.30.

AN OLD MINE MANAGER.

## REMINISCENCES—No. III.

SIR.—The highest engine stack in Cornwall, I believe, is that at Pedn-an-drea Mine, in Redruth, erected about 70 years ago; its height is about 20 fms. The present company, or rather the present working, commenced about 30 years ago. Owing to the miserably low price of tin this mine is likely to be stopped, and some others will undoubtedly follow. If ever a protective duty on tin and copper were necessary it is now more than ever so, for our labouring class is suffering from the want of necessary food, and matters are going worse every day consequent on low wages and want of employment. In connection with Pedn-an-drea I will mention a case of melancholy accident which occurred about the year 1829, when the pitwork was being drawn to the surface. A man, I think of the name of Richards, was in the engine-shaft a few feet above the water level engaged in work, when the collar on which he stood gave way, and he fell into the water, and was not seen again till 27 years after, upon a resumption of the workings. He was found in a level many fathoms from the shaft, but when touched he fell to pieces. His bones were collected and interred in Redruth Burial Ground, followed thither by his widow.

Wheal Wallis is the name of a small idle mine, half a mile north-east of Wheal Vor, which was worked a few years, ending about the year 1852, for tin. It was previously worked without steam-power at very shallow levels by the then proprietor of the minerals, which he purchased from Lord Arundell about the year 1802. I do not suppose that more than 100L. per month was expended there by him. He had two agents, each of whom received 2L. per month. The mine was then called Wheal Cruet. I remember that one night the span-beam of a whim about to be erected was stolen from the mine. There was no night watch, and no dwelling near. The same old gentleman also worked another mine on his estate called Trevanno, now the property of Mr. W. B. Smith, but with no advantage. It was afterwards worked by Messrs. Taylor and Co. with loss. One anecdote is fresh in my memory relative to that old man, who was eccentric in his manner. The agent was called Pearce, afterwards agent under Messrs. Williams, at Godolphin Mine, &c. He said to Pearce, "I want you to take your oath that you will be honest in your office." Capt. Pearce replied, "I will promise to be honest, but I will not swear, because it is not necessary or usual."

The agents at Wheal Vor were of a low class in respect to ability, and they never received more than six guineas per month, except the manager. I refer to the first working, not to that under Messrs. Crase, which commenced about the year 1852, whose agents were better paid. It is a very remarkable fact that Capt. J. Lyle had a managing agent under him at Carn Brea who could neither write nor read. His name was Miners, but he had been a good tributer, and knew well how to raise and dress ores. At the present time such a one would have no chance of an agency, education being now regarded as an essential qualification, in addition to practicability, in a mine agent.

It is said that under the Stannary regulations a mine cannot be worked by a limited liability company the second time under the same name. There seems to be a desire in the Cost book companies also to take fresh names. I know several mines which have gone under several aliases. Why is that? For the same reason that a thief to avoid detection changes his name. If the mine has been known to be poor, or if there has been dishonesty in connection with it, a new name is adopted to conceal those prejudicial facts from the investing public, who do not always investigate the history of a mine, but go by reports and prospectus.

The first steam stamping mill erected in Cornwall was at Wheal Vor in 1815; I believe I am correct in saying so. It was called "Woolfs stamps"; the engineer who put it up was called Peter Godfrey, of Neath Abbey; whence, I presume, the engine came, because at that time we had no large foundry in Cornwall. Now we have two large and several small foundries; there are Messrs. Harvey and Co., of Hayle, and other places, and Williams and Co., Perran Foundry, both of whom have large establishments. At these foundries, about 20 years ago, three of the largest engines in the world were made for the drainage of the Haarlem Lake, each engine having a cylinder of 144 in. diameter. These engines have drained the lake, which covered about 45,000 acres of land now in cultivation. The best engines in the world for drainage purposes are those manufactured in Cornwall, and which are sought after from all parts of the world. The highest stack in Cornwall is that at Par, connected with lead smelting by Mr. Treffry.

May 8.

OBSERVER.

## NEW METHOD TO PREVENT OVERWINDING.

SIR.—Mr. Stevenson, Calderbank, in his comments on the apparatus to prevent overwinding invented by Mr. Dunlop and myself, asserts that he has an invention that can do "rather more than Messrs. Dunlop and Scott's." As I never saw Mr. Stevenson's invention I cannot say a word about its merits, but have no doubt from the graphic description he gives of it in his letter it must be very ingenious. In our invention we lay no claim to the intricate and complicated connection requiring the pit headman, bottomer, or engineman to do certain things in order to prevent casualties. Quite the reverse. Our apparatus is self-acting, and puts it out of the power of any of the functionaries mentioned to cause an overwinding accident though they were willing. Indeed, simplicity of construction and a guarantee against overwinding is all we claim credit for. The construction requires no attention and cannot get out of order, neither do we require a pair of engines to show the model—we can turn it by hand.—Wishaw.

JOHN SCOTT.

[For remainder of Original Correspondence, see to-day's Journal.]

DRILLING AND TAPPING METAL.—A novel apparatus for facilitating the grinding or cutting of metals in a lathe has been invented by Mr. J. DONNELLY, of Bow, and consists first of an attachment to an ordinary lathe, which is provided with an emery wheel or other suitable grinder. This wheel is mounted on a spindle fitted to turn freely in bearings. The required rotary motion is communicated to the wheel from cone pulleys through a flexible shaft. By bringing the rim of the friction pulley into contact with the rim of one of the cone pulleys, the motion of the latter will be imparted to the friction pulley, and the latter will transmit such motion to the grinding wheel. The pivoted arm on which the latter is carried, and the flexible shaft will allow the adjustment of the grinding wheel into any desired position to suit the shape of the article or object to be ground in the lathe. In some instances he uses a weight or spring arrangement to keep the grinding wheel in forcible contact with the surface operated upon. This apparatus will greatly facilitate the grinding or tracing up of the lathe centres without the necessity of removing and setting them. If preferred, instead of using a flexible shaft for driving the said grinding wheel or roller he may employ for this purpose a belt or strap passing over one of the cone pulleys and over a pulley connected with the shaft or spindle of the said grinding-wheel. For cutting wood and other comparatively soft materials he substitutes for the said grinding-wheel or roller a rotary cutter, and operates it in the same way. To adapt the invention for drilling and tapping holes in metal he replaces the grinding-wheel or rotary cutter by a worm mounted upon a rotary shaft provided at one end with a socket for the reception of a drill, or performing implement, or a screw tap. The frame or bracket is provided with eccentric bearings for the worm shaft, and these are connected with a handle or bar, by turning or adjusting which the worm may be readily set into or out of gear with the worm-wheel.



## Meetings of Public Companies.

## NATIONAL PROVINCIAL BANK OF ENGLAND.

The annual general meeting of proprietors was held at the bank, Threadneedle-street, on Thursday.

Mr. RICHARD BLANEY WADE in the chair.

Mr. WILLIAM HOLT, one of the joint general managers, read the notice calling the meeting.

The CHAIRMAN said: The speech from this chair generally treats of matters past, present, and future, and I am happy to think that to-day I shall detain you very little under each head. Of the stagnation of business during the past year you are probably as well aware as we are. Your interests are deeply bound up in financial affairs, and no doubt you watch with the same keen interest as we do the variations in the value of money, the amounts of exports and imports of manufactures from this country, and therefore I need not detain you with any account of the stagnation of which we are all too well aware. It might be a more interesting question if we considered a little the causes of the stagnation which we are passing through, but the stagnation such as we suffer from no doubt arises from a combination of circumstances, but I believe the principal cause is the old one—the reaction from a very active state of commerce which we enjoyed three or four years ago. Fortunately for us, our branches are so well situated, and command so much business, that we have not suffered so much as might be expected from that cause, and we are able now to declare the same amount of dividend and bonus as we have done for some years past, and you must recollect that involves paying the shareholders some 23,000, more than in the year 1877, the whole of the new capital now receiving both dividend and bonus. Not only have we been able to do that, but we are able to carry over to new account almost the same amount which we did in the previous year, for there is only a difference of 14% in the two sums. You will see in the report that we have taken over the business of the Bank of Leeds. Leeds stands in the centre of a very active commercial neighbourhood, and we have for some time been anxious to establish ourselves in that district, and we were glad to take the opportunity which presented itself to us last year of the transfer of the business of the Bank of Leeds to this establishment. I wish I could tell you upon the present occasion that the stagnation of which we have been speaking had passed away, but we find ourselves in the same state of inactivity, and all we can hope and desire is that sooner or later—soon we hope—it will pass away, but at the present time I cannot tell you that we see any signs of amelioration in that respect. It is always a satisfaction to us to assure you (which we can do to-day) that the position of the bank in every way is perfectly satisfactory. We find ourselves with a very large paid up capital amounting to 1,687,500, and with our reserve of 900,000, quite intact. We also show you a very satisfactory amount in the increase of deposits, although not so large as in former years, which I think is not at all to be wondered at. A glance at our balance-sheet if you will look at the three first items on the side of the assets will show you the very strong position in which the bank stands, and I feel sure that any man of business looking at that balance-sheet will feel inclined to deal with a bank which is in such a very strong position. But, gentlemen, with all these advantages if we had not in our service a most efficient staff I need hardly tell you that the progress of the bank could not be of the satisfactory character which we are able to exhibit. (Cheers.) I cannot speak in too high terms of the efficiency and conduct of our staff. Of course, when I speak of such a number—of 1000 or 1100—I speak of them as a whole, and I do not mean to say that we have not weak vessels in such a number, but I can say with certainty that there is no staff which surpasses them in energy, activity, and zeal in this or any other country. (Cheers.) That staff is still watched over and superintended by our able general manager. We will have the good fortune to have at our right hand Mr. Holt and the two new general managers who joined us within the last two or three years, and each day shows a proof that we made a most efficient selection when we appointed them to the high position they fill. (Cheers.) And now, gentlemen, as to the future I have still less to say than I have about the past and present. The same policy which has conducted the affairs of this bank up to the present time will be continued, and I doubt not we shall be able in future years to show you as good a report, and as good a state of the business of the bank, as we do to-day. (Cheers.) I will now, with your permission, move the adoption of the report and accounts, and when that is seconded I shall be happy to hear and answer any question you may put.

Mr. JOHN O. HANSON seconded the resolution.

Mr. REEVES said that having attended these meetings for 20 years he could not allow the present meeting to pass over without congratulating the directors on the intensely satisfactory report which they were now able to present to the shareholders. (Cheers.) He also congratulated the Chairman on the position which he again held, and he also considered it a subject of congratulation that there had been no vacancy on the board during the year. (Hear, hear.) Looking at the depression and confusion which had prevailed in the commercial world during the past six months, he was sure that most of us must have been anxious to see the directors. Looking at the progress which the bank had made since 1863, when the present noble building was built, he could hardly look upon that progress as wonderful. He would ask whether there was any truth in the rumour which he had heard that the directors were about to take over a bank in Kent. He congratulated the shareholders on having taken over the Leeds Bank. He asked what the directors intended to build on the site of the two houses which they had purchased adjoining the bank, and what was to be the outcome? He also asked regarding the progress of the Benevolent and Guarantee Fund?

The CHAIRMAN having acknowledged the kind remarks of Mr. Reeves, went on to say that with regard to the purchase of the bank in Kent all he could say was that the directors knew nothing about it. (A laugh.) The directors were not at present in negotiation for the purchase of any business. With regard to the enlargement of the bank, some time ago they were fortunate enough to purchase the two houses adjoining the bank, the leases having run out, and were about to incorporate them with this building. When the work was finished he thought they would all think that it would add immensely to the appearance of the building, and it would also, and perhaps this was more important in the business point of view, give accommodation to 44 additional clerks. Large as the present premises appear to be, the clerks are somewhat cramped for room in some of the departments, and there was considerable difficulty in transacting the amount of business with which they had to deal. Mr. Reeves might be assured that the amount of money to be spent upon the building would be moderate, and, looking at the great increase of accommodation, he might say more than moderate. The alterations would be carried out by Mr. John Gibson, the architect to the bank.

The resolution was then put and carried.

On the motion of the CHAIRMAN, seconded by Mr. G. H. HANBURY, the Marquis of Ailesbury and Mr. Henry Paul were re-elected directors.

Mr. J. B. D. SCOTT, Bart., said he had very great pleasure indeed in moving the resolution as a director of the bank. He was surprised to see so small a number of shareholders present, but he thought this might be taken as a proof of the great confidence which the proprietors had in the directors. He was especially pleased to see present their old friend Mr. Atkinson, whom they might look upon as an extraordinary director, and to whom so many thanks were due for the prosperity of the bank. (Cheers.)—Mr. HAST seconded the resolution, which was put, and carried.

The CHAIRMAN, in acknowledging the compliment, said it was scarcely necessary to state that the directors felt the very deepest interest in the success of the bank, and there was no labour which his colleagues would not take which would conduce to the welfare of the bank, and they were encouraged in that feeling by the confidence with which the shareholders had supported them in all the troubles and difficulties they had had to pass through.

Mr. REEVES proposed that the cordial thanks of the shareholders be given to Mr. W. Holt, Mr. R. Ferguson, and Mr. F. G. Robinson, the joint general managers, for their efficient services. From a long knowledge of the bank and several of the branches he could speak from personal experience of the high efficiency of those gentlemen, and the more he saw of them the more he was convinced they were thoroughly reliable men. (Cheers.)—Mr. GILL seconded the resolution, which was put, and carried.

Mr. W. HOLT acknowledged the compliment. He said that every care was exercised in the selection of youths taken into the service, and the directors exercised the same care in filling vacancies which occurred from time to time, and he thought that the meeting would be prepared to endorse every word of the Chairman—that they never had a more able or efficient staff than at the present time. (Cheers.) There was amongst the officers of the bank a very earnest desire that the very high position which the bank occupied amongst the leading institutions of the country should be continued, and he was sure that their energies would be directed to achieving that result. (Hear, hear.) With regard to the benevolent fund, without stating what the income was he might mention that the directors

had been able to render material assistance to those who had a right to expect it, and that fund was increasing year after year. As regarded the guarantee fund, that fund was at the present time nearly double the amount which the directors originally thought it should be kept at. Many of the older officers did not now contribute to the fund, as it could be kept up by the new members in the bank and the more youthful part of the staff. There had been only a debit to that fund for a very long time, and that was for a very small amount, and arose not from fraud, but from a little inattention to duty. As that fund was growing they might be able to strike out some plan by which the officers would be able to receive some benefit from it. Referring to the proposition made some time since to commence banking hours at half-past nine instead of nine, he expressed his regret that the attempt had not been successful. He alluded to the great bon which it would confer upon the clerks respectively in the short, cold days of winter, and expressed a hope that before long some further steps would be taken to bring about that desired change. (Cheers.)

A cordial vote of thanks to the Chairman closed the proceedings.

## RIO TINTO COMPANY.

The fifth ordinary meeting of shareholders was held at the Cannon-street Hotel, on Tuesday.

Mr. H. M. MATHESON (the Chairman) presiding.

The notice calling the meeting was read by Mr. R. J. FENNESSY (the secretary).

The CHAIRMAN said:—Gentlemen, I rise to move that the report and accounts now presented be received and adopted. When we issued the circular of last November we were in a position to inform you generally how the affairs of the company were progressing during the year, and for the reasons which we gave, there would be a deficiency of revenue when the year's accounts should be made up. The unprecedented depression of trade, a smaller production of copper, and the very low and falling prices of that metal were stated to be the chief causes for the result. It will be seen that our anticipations were but too well founded. The deliveries of pyrites to buyers, in fulfilment of contract, fell still more short of the estimate than we then anticipated, and only reached 211,000 tons instead of 220,000 tons. The copper produced likewise fell short, reaching 2735 tons metallic instead of 3000 tons, and the price, I am sorry to say, continued to decline, till it is now said to be lower than it has ever previously been known. Nevertheless, owing to the economy introduced into every department, after a sifting examination of all the details, the actual results of the year's working proves somewhat better than we anticipated when the circular was written. I will endeavour, however, and as briefly as possible, to supply you with the facts regarding your property, and indicate as clearly as I can the present position and prospects of the company. First let me refer to the accounts. A revenue account is now presented for the first time, as we promised you it should. It has been debited with all interest and charges upon mortgages and other debts, and with the entire expenditure of administration. This expenditure, although large, is absolutely unavoidable, from the vast scale of the enterprise and the very large staff of officers necessary in Spain. The account has been credited with the profits on produce, 185,833, 4s. 9d., and which, although a good deal less than we anticipated when we last met you here, is quite as much as was foreshadowed in the November circular. It exceeds by 28,000, the profits realised in the whole of the three previous years' accounts, extending from 1873 to 1876, and there can be no reasonable doubt it will be further greatly augmented during the present year. The entire profit of the year is, in fact, 2,4,054, 18s. 11d., which would have reduced the deficiency to a very inconsiderable amount, but this is partly made up by an item which we treat separately for the present. When we arranged with the Spanish Government for the issue of 5 per cent. bonds in payment of certain over-due coupons of their foreign debt, we stipulated that the annual redemption for the sinking fund should be made not by drawings at par, but at our option by purchase in the market, anticipating that for some time at least a profit would accrue to the company on those purchases. The profits from this source, increased by certain differences of interest, amounted to 40,118, 8s. 9d. Now, there can be no doubt there is a difference between this class of profit and ordinary profit, and I have stated, the directors, under the advice of the auditors, acting upon a strict and dry principle, have placed this amount to a separate account, as it is unnecessary to deal with it for the moment, but the directors are to consider the matter in the interval between this and next year, and should they be of opinion that during the present growing position of the company, it is for the interest of the proprietors to add the amount in question, along with the corresponding further profit to be anticipated, to the earnings of the year, they will not hesitate with your approval and concurrence to do so. In that case, gentlemen, it may with some confidence be anticipated that the long lane of Rio Tinto will have been turned. (Hear, hear.) I now pass to the balance sheet. The share capital remains the same, but the mortgage bonds have been redeemed, the redemption of 95,780, in the year. The loans on current account form our floating debt; this might almost be extinguished by the issue of the second million of 7 per cent. bonds, comprised in the mortgage along with the others, but as the money is held on much easier terms for the present the directors consider it better to avoid funding the debt, unless circumstances render it desirable to do so.

—Redemption of the Mortgage Debt: It will be quite understood that this is a fresh money borrowed to meet the sinking fund of the mortgage debt, and for some years to come this item of our indebtedness will increase in exact proportion to the debt on mortgage is redeemed. Ultimately we look to the produce of the mine for the extinction of borrowed capital, but the property must first be brought into a dividend paying condition, and then any surplus earnings which may be made will be considered with this object in view. The item of sundry creditors is chiefly for January coupons, and is of a temporary character, the cash being in hand per contra, and it would be paid out as fast as the coupons were presented. I now pass to property and assets, and beg you will follow the explanation of the various items. The cost of mines remains very much the same as it was last year, all payments appertaining to it having been settled previous to last annual meeting. As to the cost of the railway, pier, and tunnel, this item has been apparently augmented by 104,860, but this is only the cost of rolling stock (which is put here by the advice of the auditors, and has been previously deducted from the succeeding item), and the final payment—about 15,000, on account of the pier. The Customs dues on material in suspense is retained in the balance-sheet as a foundation for our claim upon the Spanish Government at any possible future period. As to the cost of buildings, &c., these several successive items are increased, owing to the great extension of work to be done—for precipitating tanks, tramways, houses for workpeople, &c., which form the main items.

I may mention that the income derived from houses gives 5548, 11s. 2d., upon a total outlay of 56,478, on an interest of close upon 10 per cent. As regards the output it is at the rate of 3500 tons per working day, or over 1,000,000 tons per annum. Of the entire quantity of mineral estimated by the late Mr. Forbes to be contained in the portion of the south lode being worked by open-cast—that is, from the top to the level of the great tunnel—11 millions of tons, the company has removed 1,238,282 tons, leaving still to be extracted at this spot 9,761,718 tons. This south lode is the only part of our property that has been previously worked for mineral in modern times, and in this respect it compares disadvantageously with the other important mines of the district, which, like our central and north lodes, has not been touched since the days of the Romans. Our south lode, in the part of it which we have uncovered, has been to a large extent honeycombed by Spanish workings down to the level of the 9th floor, and the consequence is seen in the lower percentage of copper contents it has hitherto yielded. It has to a considerable extent been bled by the drainage of copper water for 150 years. We have obtained regularly 3½ tons of metallic copper per week since taking possession of the mines, from the cupreous water which flows out of the mine in a scarcely varying quantity. As the open cast descends and we go to work in the 25 metres of mineral between the 9th floor and the tunnel level, it may be expected that we shall find some better average of copper, owing to the ore being practically virgin. We have, however, described in the report with almost all the detail necessary the development of the mine, the new works in progress and in contemplation, the water supply, &c., so very few words more, probably, will suffice. We refer in the report to the "exploration" to the west of the open cast, but the word should have been "driving" or "drift," as this is being opened in mineral, and is in no sense to prove the existence of mineral in that direction, but in order to determine the width and quality of the lode, and the conditions in an economical point of view, which must determine the managers in regard to its future treatment. The shareholders will understand that in the north and central lodes, where no modern workings have penetrated the directors are led continually to expect to find richer mineral. The quantity of ore in these deposits has not been ascertained by any reliable estimate; it may be safely taken, on the testimony of Spanish and all other engineers, to be exceedingly large and practically inexhaustible.

—Cementation: The new tanks for washing burnt ore, and those for precipitating the copper, have got into good use, and are doing good work. Experiments with the view of obtaining a better production of copper from the mineral have been tried during the winter, but without as yet satisfactory results. Meanwhile, however, by the intelligence and skill of our own officers constant improvements and economies are being introduced. The consumption of iron in the precipitation of copper has been reduced to an unprecedentedly low figure, and in spite of the great scarcity of water from the short rain-fall during the season the quantity of copper produced weekly has been constantly increasing until it now exceeds 90 tons of metallic per week. As regards the future of the pyrites trade, we refer with satisfaction in the report to the cordial understanding which has been come to with the great competing producers—the Tharsis Company and Messrs. Mason and Barry. This arrangement will, in the opinion of your directors, be very beneficial to the Rio Tinto Company. It provides, among other things, for uniformity of price, and it does away with the competition which has hitherto existed in the trade, and was serving the interests neither of the consumers nor of the producers. Prior to the treaty being entered into we had been making considerable sales for forward delivery, both for sulphur and copper, at former rates; nevertheless, large sales since made will yield as substantial benefits after the close of the current year.

In spite of the very depressed state of the chemical trade, the consumption of pyrites for 1877 appears to have reached 600,000 tons, and by those who understand the trade best it is anticipated, partly owing to the increase of manure works, that the consumption will increase. Our own sales for the year 1878 amounted to 242,000 tons, the trade in copper, as well as that of every other metal, is extremely depressed, and prices are still dropping. It appears, however, that the quantity yielded by Spanish and Portuguese pyrites exerts a sensible influence on the market; so, it is not likely that the production in other countries may become, to some extent, unremunerative, and imports accordingly be diminished in consequence. We may, therefore, hope that a revival of general trade may clear off stocks, and bring about a return to a more satisfactory range of prices. Before concluding I must acknowledge—and it is grateful to my feelings to do so—the efficient assistance which the board has received from the general manager in Spain—Mr. Mark W. Carr—and the members of his staff. These become more valuable with each year's accumulating experience. To the good advice of our consulting engineers—Mr. J. A. Phillips—we also owe much; he has recently returned from the mine, where he has been studying the future development of the larger lodes, and is now laying the results he has arrived at before the board. The directors have had heavy and responsible work to perform; there is much of the same work before them, but much good progress has been made, the result of which will be more apparent in this and following years. We promise a continuance of our best exertions so long as we enjoy your confidence. We have but one wish, and that is to work this great property so that it may be as soon as possible in a remunerative and dividend-paying position, and we think our task is a good deal nearer completion than it appeared to be a few months ago. (Loud cheers.) Having expressed his willingness to answer any question the Chairman concluded by moving the adoption of the report and accounts.—Mr. W. MACANDREW (the deputy chairman) seconded the resolution.

Mr. DUNDAS congratulated the shareholders upon their extreme patience from year to year; they were not a fault finding body of shareholders, and their patience under disappointment arose from their unbounded confidence in the directors. (Cheers.) He knew that, for his own part, he should never have put any money in the mine had it not been for the confidence he had in their respected Chairman. (Cheers.) The longer he knew Mr. Matheson the more he esteemed him. But he did not say that to the detriment of the other directors, who were as much entitled to their confidence. He should like to ask the Chairman whether before another year passed over the original shareholders might expect some return upon the capital? For his own part he considered the present report the most encouraging they had yet had.

Mr. H. HOLMES thought the expenses in London somewhat heavy, but possibly that might arise from freights or something of that kind being included.

Mr. G. HAMILTON asked whether there was any probability of utilising the pier or railway so as to form an additional source of revenue?

The CHAIRMAN said that, on behalf of the board and himself, he must express the high sense he entertained of the kind feeling and forbearance which for all these years the shareholders had exercised towards the directors. As regarded the question of Mr. Dundas, he (the Chairman) said he could scarcely venture to forecast the future beyond what he had said in his opening remarks, in which he very clearly indicated his own confident expectation that another year would not pass without something being paid. They lived in very extraordinary times, and those engaged in trade were sensible of the depression and gloom which pervaded all manufactures and industries, and the company shared in that. In addition to the special circumstances which affected themselves, but he thought, looking at all the circumstances of the mine, they might as all events expect a moderate recovery of the year. As regarded the expenditure in London, it was upon the lowest possible scale compatible with efficiency. The directors had gone through every item of expenditure, and made reductions where possible. The expenses in London included office expenses, salaries of secretary and clerks, directors' remuneration, mercantile commission upon sale of produce, and sundry small expenses, and he might add that the whole expenses, both in Spain and London, only amounted to 10d. per ton upon the quantity of ore extracted. (Cheers.) As regarded Mr. Hamilton's question about the pier, he might state what he omitted to mention in his opening remarks—that the long-projected railway from Seville to Huelva was being rapidly proceeded with, an arrangement having been made with the Madrid, Saragossa, and Alcantara Company, which possessed the line from Seville to Cordova, and thus gave access to Madrid and the centre of Spain, to work the line from Seville to Huelva. There could be no doubt that when the railway was finished, which would be in the summer of 1879, this company would derive an important revenue from the pier dues, but beyond that he was not sure of any other large source of revenue. But he might pointedly remark that the copper, which this year was reported at 2700 tons—an increase of 1400 tons upon the previous year—would certainly be increased during the present year to 4000 tons, and upon an average of years they would, without doubt, steadily increase year by year the production of copper.

The CHAIRMAN, in answer to a further question by Mr. DUNDAS, said the present price of the copper might be said to be 61/10s. per ton—the same as Chili bars. He might mention that had the price of copper during the past year ranged at the same price it did two years previously it would have made a difference in the profits of the company of over 150,000.

The report was then adopted.

On the motion of the CHAIRMAN, seconded by Mr. MACANDREW, the retiring directors, the Hon. T. G. Bruce, M.P., and Mr. A. G. Dallas, were re-elected.

On the motion of Mr. J. H. DAVENPORT, seconded by Mr. M. R. MALL, the auditors, Messrs. Turquand, Youngs, and Company, were reappointed.

A SHAREHOLDER suggested that the monthly reports should be published in the Mining Journal.

The CHAIRMAN said the nature of the business was such, and the contracts were made so long before hand, that he was afraid the reports would not afford much real information to the shareholders. However, it was a point which the directors would bear in mind.

On the motion of Mr. DUNDAS a very cordial vote of thanks was passed to the Chairman and directors, and the Chairman having acknowledged the compliment the meeting broke up.

## EBERHARDT AND AURORA MINING COMPANY.

The ordinary general meeting of shareholders was held at the City Terminus Hotel, Cannon-street, on Monday.

Mr. E. L. J. RIDSDALE (Royal Mint) in the chair.

Mr. ALFRED CRITCHETT (the secretary) read the notice convening the meeting. The reports and accounts were taken as read.

The CHAIRMAN said he rose for the purpose of moving the first resolution, which was "That the accounts and balance sheet as presented this day be received and adopted." The shareholders would see at once on inspection that the amount of silver raised from these mines during the past year had been very considerably less than the amount raised before on any occasion since he had been connected with the company. In the preceding year—in 1876—they had sold in the London market bullion to the amount of 106,633. This year, as shown in the balance-sheet now brought to their notice, they had only sold bullion representing 12,127. Well, that had no doubt been a very unfortunate state of things. When they contemplated the driving of the tunnel to open up the wealth of the mountain and get to the deposits in depth under their old mine, it was naturally supposed that they would get out about the usual amount of bullion which they had been in the habit of getting hitherto; and, therefore, not only have been able to pay their working expenses, but that they would have been able to pay the expenses of the tunnel out of it, and also have been able to declare a reasonable dividend as well. But they had met with those uncertainties which were inseparable from mining, and instead of getting over 100,000, by the sales of bullion during the year, they had only got 12,000. Fortunately the shareholders were wise enough at the last meeting out of the large amount of bullion sold in the previous year to concur with the resolution of the board, or rather with the proposal offered to them by the board, that they should put by and conserve a large portion of the profits of the preceding year as a reserve fund in case anything unfortunate should occur, while they divided, as they were aware, a small sum in dividends. There was first a dividend of 5s. per share, and then of 3s. Many gentlemen present pressed the board to declare a very much larger dividend. Some wanted 5s., and others wanted 10s. He saw Mr. Taylor present, and he (the Chairman) thought that gentleman wanted to compromise the matter and have a 7s. dividend. Well, if they had declared that dividend they would have had no mine now, or at all events the mine would have been in a debt to the mine and the property belonging to the company would have been pledged for that, but fortunately the bulk of the shareholders fell in with the proposal advocated by the board, and decided to take a small dividend and put the bulk of the money to the reserve fund. Well, he thought the shareholders would now see that that course had enabled the company, at all events, to drive the tunnel nearly 200 ft. further out of the reserve fund put by at that time. They had also got a property intact, and the reserve fund, although severely stretched upon, still represented a considerable amount of money in hand, and during the past year they had got out a large body of ore, which would enable them, with the reserve fund in hand, to go on driving the tunnel, and he hoped that it would enable the company to discover some of those bodies of ore they had hitherto been successful in discovering, and thus to put the company into a position in which they would have a prosperous course. The shareholders had, no doubt, seen from the short circular sent to them some time ago that the reserve fund had been diminished to the amount of 7000, but they had broken in the mine and had got on the dumps an amount of ore which, from the telegram he would read to them directly from Capt. Drake, would show them that there was a further amount of about 20,000, to be added to the balance of the reserve fund available for the prosecution of the mine. The shareholders would, he thought, agree with him that that was a favourable prospect. Of course, that 20,000 would be diminished by the ordinary cost of milling the ore, but that would only be a proportionate sum, so that the result was not at all an unsatisfactory one. When he met the shareholders last year the tunnel was then in about 1100 ft. It was now in 3100 ft., by this time the barren ground had all been passed through, and they were now under those mines from the uppermost workings of which so much Capt. Drake taken a short time ago. The telegram received that morning from Capt. Drake was to the effect that they had got 700 tons of assorted ore on the dump, and they had broken in the mine, but had not isolated, an estimated amount of 1-100 tons; and Capt. Drake estimated the total assay value of these two amounts at \$100,000, or 20,000. The present indication of the ore body that was in North Aurora was unfavourable for long continuance. The character of the lode varied from time to time considerably, sometimes being worse and sometimes better; and there had also been a large body of ore, which would enable them, with the reserve fund in hand, to go on driving the tunnel, and he hoped that it would enable the company to discover some of those bodies of ore they had hitherto been successful in discovering, and thus to put the company into a position in which they would have a prosperous course. The shareholders had, no doubt, seen from the short circular sent to them some time ago that the reserve fund had been diminished to the amount of 7000, but they had broken in the mine and had got on the dumps an amount of ore which, from the telegram he would read to them directly from Capt. Drake, would show them that there was a further amount of about 20,000, to be added to the balance of the reserve fund available for the prosecution of the mine. 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**SHIPBUILDERS' AND RAILWAY STORES' CONTRACTORS.**

## PROPRIETORS



AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

# HADFIELD'S STEEL FOUNDRY COMPANY,

## ATTERCLIFFE, SHEFFIELD,

DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

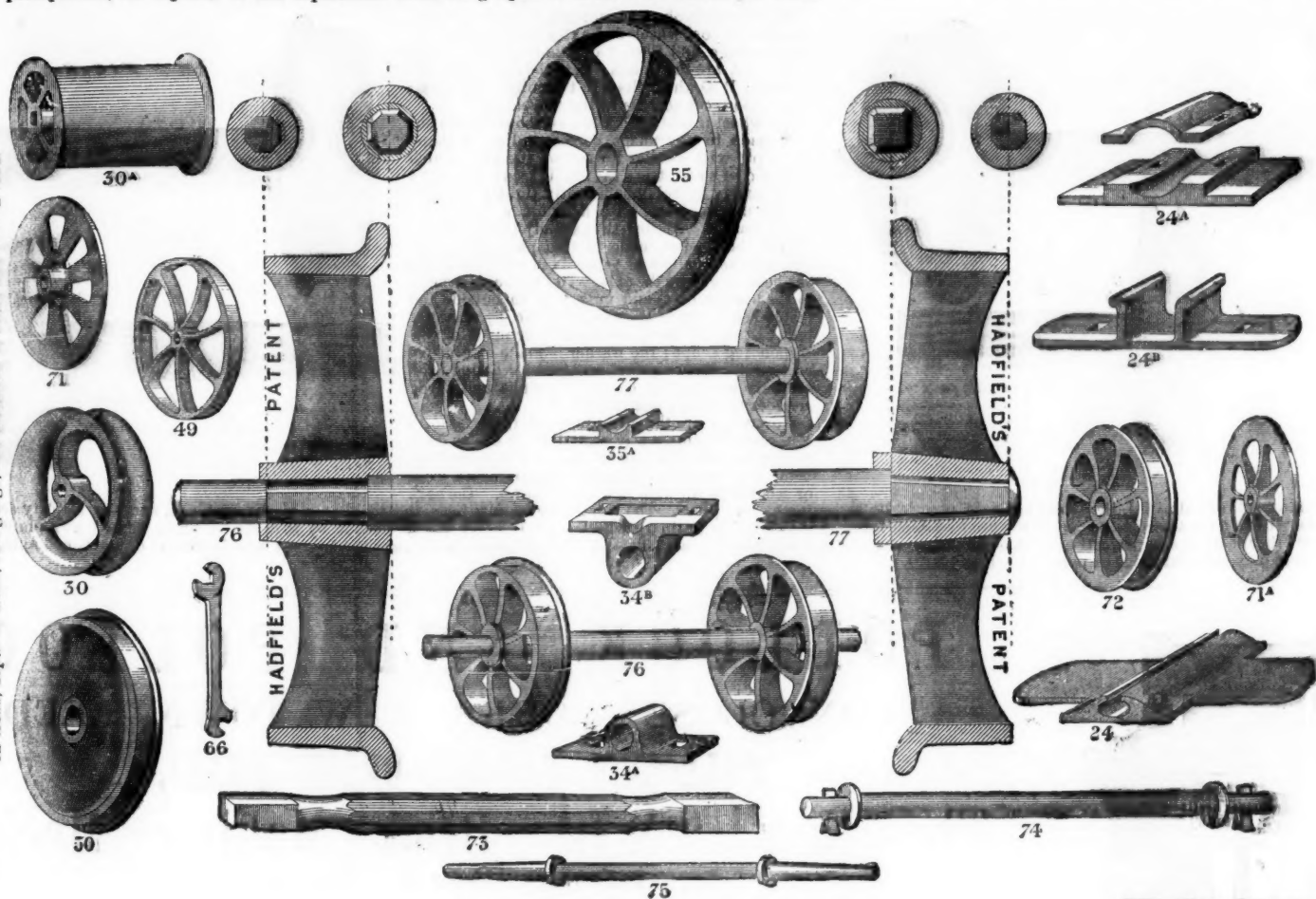
### CRUCIBLE STEEL CASTINGS, for Engineering and Mining Purposes,

AND ARE THE SOLE MAKERS OF

#### HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.

N.B.—Prices per Set of Wheels and Axles fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, real gauge, and thickness of axle and rolling load.



[This Sheet of Drawings is Copyright.]

#### HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

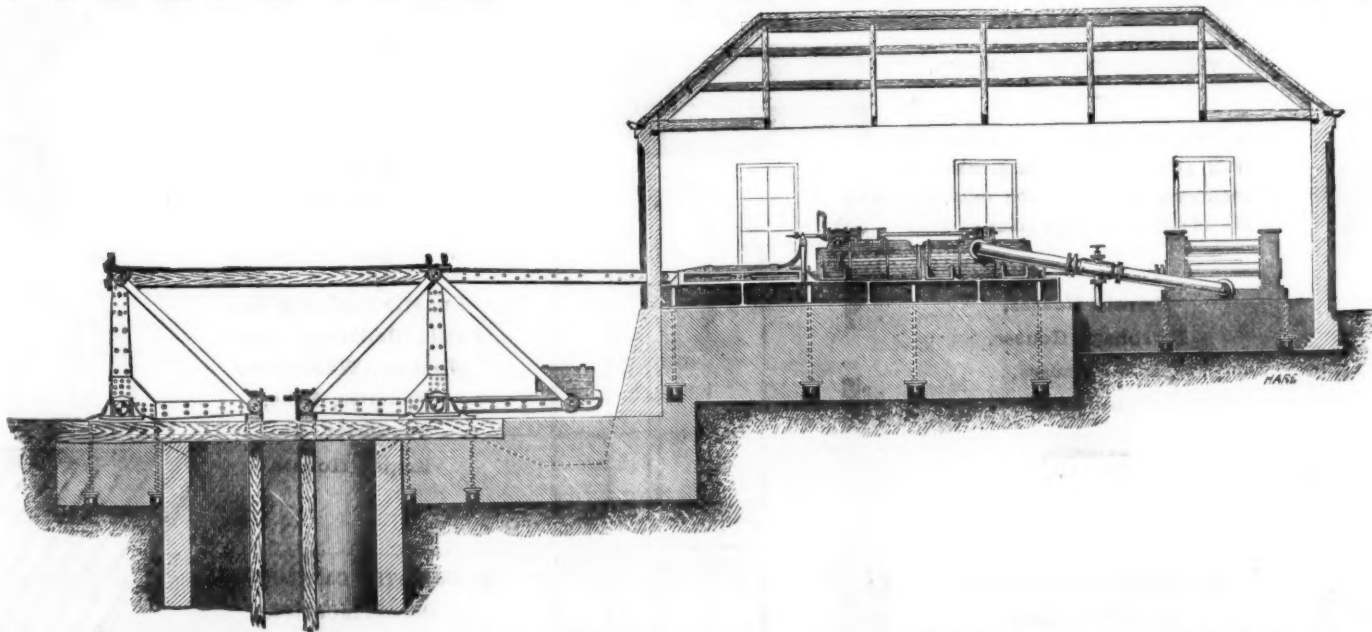
The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heavily fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

## COMPOUND DIFFERENTIAL PUMPING ENGINES.



### HATHORN, DAVIS, & DAVEY, LEEDS.

THE COLLIERY READY-RECKONER AND WAGES CALCULATOR.

By JAMES IRELAND.

"Will be the means of preventing many disputes between pay clerks and colliers."—Mining Journal.

To be had on application at the MINING JOURNAL Office, 26, Fleet-street, E.C.

THE NEWCASTLE DAILY CHRONICLE

THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISER  
Office, Westgate-road, Newcastle-upon-Tyne; 50, Howard street, North Shields; 195 High-street, Sunderland.

#### YEADON AND CO COLLIERY & MINING ENGINEERS,

Manufacturers of WINDING, HAULING, and PUMPING ENGINES, EMMET'S PATENT BRICK MACHINE, Boilers and Fittings, Steam Piping, Donkey Pumps, Lift Pumps, Perforated Clay and Mortar Mills, Round and Flat Rope Pit-head Pulleys, Wrought-iron Head Gear, ROOFS and GIRDERS, Kibbles, ONE, TWO, and THREE-DECK CAGES, COAL TIPPING and SCREENING APPARATUS, VENTILATING FANS, TUBBING, GIRDERS, PILLARS, POINT PLATES, and every description of Colliery and Mining Plant.

#### CROWN POINT FOUNDRY LEEDS.

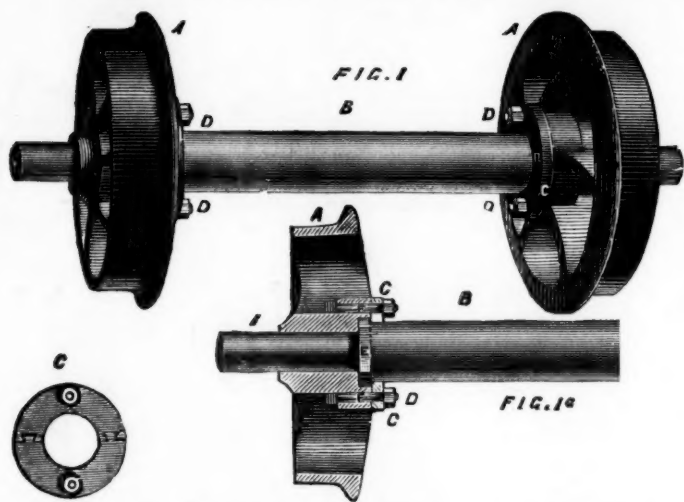
LONDON AGENTS, — HAUGHTON AND CO., No. 122, CANNON STREET E.C.



# JOSEPH FENTON & SONS,

MANUFACTURERS OF  
CAST STEEL AND FILES,  
AND  
CRUCIBLE CAST STEEL CASTINGS,  
Sykes Works, Eyre-st. & Bridge-st., Sheffield. London Office: 118, Cannon-st., E.C.

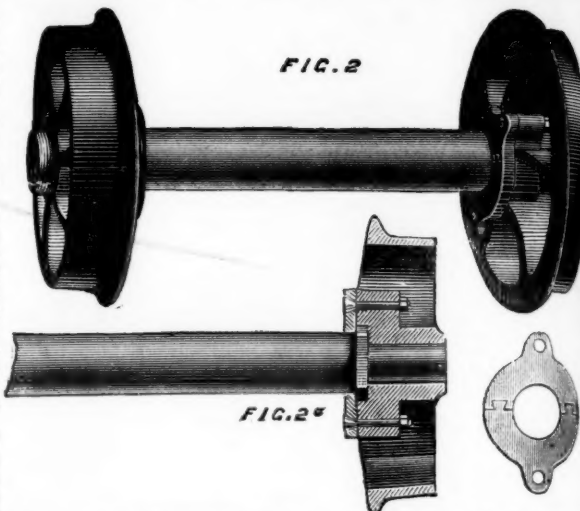
## A New Patent Method of Fitting up Wheels and Axles.



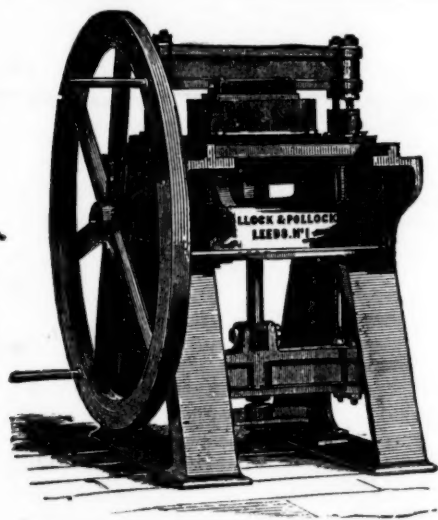
Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axle fitted up for outside bearings, and Figs. 2 and 2a for inside bearings. A A are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle, which is forged of solid steel; the axle is secured into the recess partly by being sufficiently tightly fitted to require driving home with a hammer, and partly by the washer. Around the axle adjoining the boss is fixed the washer, made in two parts and dovetailed, so as to allow of being fixed after the collar has been forged on the axle. The washer is secured to the boss by bolts and nuts, both in outside and inside bearings; in the case of inside, by means of lugs cast on the boss, and the washer made of corresponding shape; the washer is made of crucible cast steel. The only tool required for fitting is an ordinary spanner for outside bearings, and a box spanner for inside bearings.

Now what are the advantages of this method? You secure a simple way of fitting—it can be done by anyone who has seen it—the only tool required being a spanner; the wheels can be detached from or secured to the axle in a few minutes. The next



advantage is the perfect solidity attained, the wheel and axle practically becoming as one piece. The durability results from the toughness of the material, and the solidity secured in the fitting. Another thing is the wheels do not need to be put in the fire to detach them, as is the case in ordinary wheels, which would render other steel wheels perfectly brittle as glass. (N.B.—Our wheels cannot be injured by being heated and plunged into cold water, which would render other steel wheels perfectly brittle as glass.) Saving in fuel and wages is evident—no skilled labour being required to refit wheels in case of a strained axle. By adopting this system colliery owners may save hundreds of pounds sterling yearly.



## POLLOCK AND POLLOCK, LONGCLOSE WORKS, NEW TOWN, LEEDS, POLLOCK'S PATENT BRICK PRESS, The New "XL" Brick-Making Machines,

THE CHEAPEST AND BEST IN THE MARKET.

Improved Grinding Pans, with patent self-acting delivery.  
Vertical and Horizontal Engines.

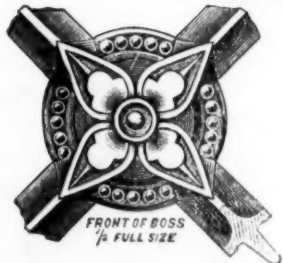
COLLIERY ENGINEERS.—WINDING ENGINES OF ALL SIZES.

POLLOCK AND MITCHELL'S PATENT KILNS are the Cheapest and Simplest.

London Office—155, Fenchurch Street, E.C.

## HARRIS'S PATENT WROUGHT-IRON WINDOWS.

DOME AND OTHER ROOF LIGHTS, FLOOR AND PAVEMENT LIGHTS, ETC.

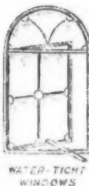


GREAT BRITAIN,  
UNITED STATES OF AMERICA,

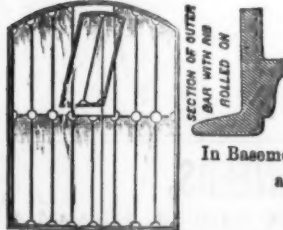
ARE STRONGER, SUPERIOR, AND CHEAPER  
THAN ANY OTHER METAL SASHES YET  
PRODUCED—COST LESS FOR GLAZING—  
ARE AS CHEAP IN MANY CASES AS WOOD



PAIR OF SASHES  
TO RUN WITH WEIGHTS



WATER-TIGHT  
WINDOWS



BASEMENT SASH  
NO GUARD BARS OR  
SHUTTER REQUIRED



SECTION OF OUTER  
BAR WITH RIBS  
ROLLED ON

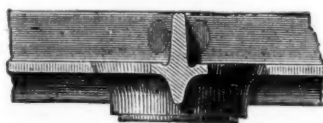
In Basement Storeys and Exposed Positions Shutters  
and Guard Bars are dispensed with.

HOME AND

SOLE MAKER—J. T. HARRIS, Engineer, Ironfounder, and Manufacturer,

SAFE, STRONG ROOM, AND PARTY WALL DOORS, AND EVERY KIND OF CONSTRUCTIONAL AND BUILDERS' IRONWORK, LIFTS, HOISTS, ELECTRIC BELLS AND TELEGRAPHS, &c.  
90, CANNON STREET, LONDON, E.C.; AND BEAUFORT IRONWORKS, BRISTOL.

PATENTED IN



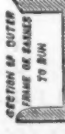
SEPARATE BAR  
FOR CASEMENTS



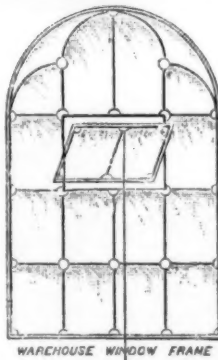
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FOR CASEMENTS



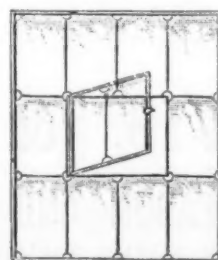
SEPARATE BAR  
FOR CASEMENTS



SEPARATE BAR  
FOR CASEMENTS



WAREHOUSE WINDOW FRAME



FACTORY OR MILL WINDOW FRAME

FRANCE,  
GERMANY, AND BELGIUM.

CAN BE DESIGNED AND MANUFACTURED  
TO SUIT ANY STYLE OF ARCHITECTURE  
OR POSITION WHERE A WINDOW MAY BE  
REQUIRED.  
ARE BEING EXTENSIVELY USED IN—

Lunatic Asylums, &c.,  
Public Buildings, Banks,  
Wharves, Warehouses,  
Factories, Mills,  
Breweries, &c.,  
Engine Houses.

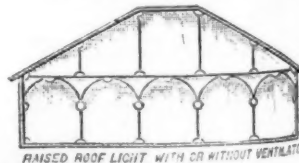
ILLUSTRATED CATALOGUES  
ON APPLICATION.

Security is obtained in  
these Skylights with-  
out Guard Bars, and  
with less obstruction  
to Light.

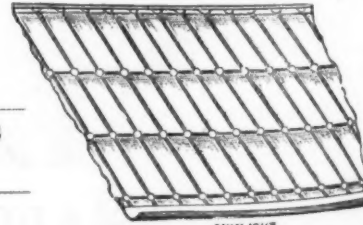
EXPORT.



BACK OF BOSS  
1/2 FULL SIZE



RAISED ROOF LIGHT WITH OR WITHOUT VENTILATOR



SKYLIGHT



FLOOR OR PAVEMENT GRATING FOR GLAZING



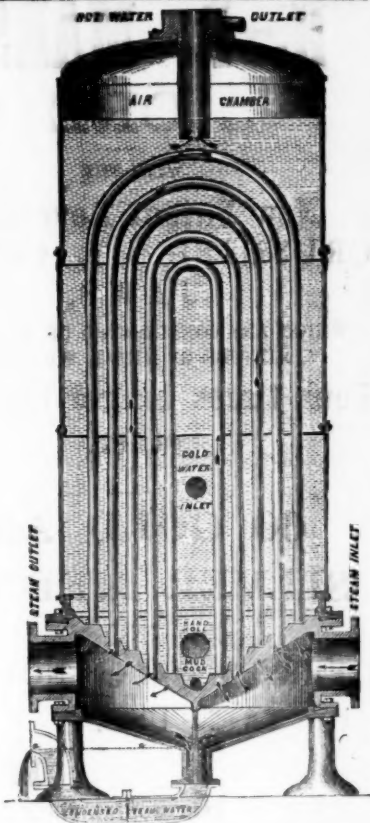
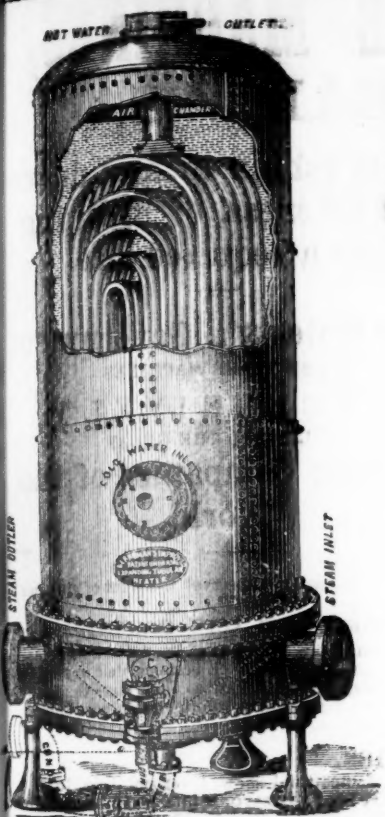
IMPORTANT.

# JOSEPH WRIGHT AND CO.

(LIMITED),

## NEPTUNE FORGE ENGINE AND BOILER WORKS,

# TIPTON, STAFFORDSHIRE.



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

### GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, the sewage and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-HOUSES, AQUARIA, GREEN-HOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using FOUR HUNDRED AND THIRTY-THREE of these Heaters.

## COLEBROOK'S PATENT STEAM PUMPS, FOR HIGH OR LOW LIFTS AND GENERAL PURPOSES.

SOLE MAKERS,—

# MAY AND MOUNTAIN,

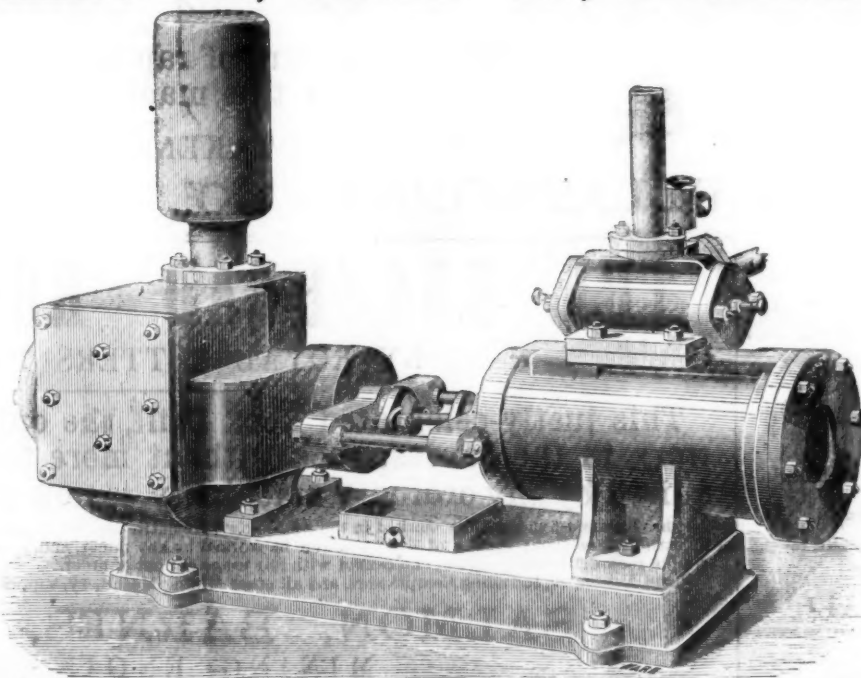
BERKLEY ST., BROAD ST., BIRMINGHAM.

The accompanying Engraving represents a Steam Pump, suitable for general purposes; it possesses the following advantages over any other Steam Pump yet before the public:—

1st.—No tappets, eccentrics, levers, or other mechanical appliances are used to actuate the steam slide valve, but this office is performed by the exhaust steam.

2nd.—The only working parts in the steam cylinder are the piston and slide valve, and as there are no working parts in either the piston or cylinder covers, the full length of stroke is obtained.

3rd.—The slide valve is so easy of access that it can be examined, cleaned, and replaced in a few minutes, and it is impossible to make any error in replacing it



after examination, because it is immaterial which way it is inserted in the valve-box, whether one way or the other upwards, or whether end for end.

The Pump Valves are Colebrook's Patent, and are made in one piece. They are either of canvas, leather, india rubber, or other material, to suit the nature of the liquid to be pumped, and can be replaced in a very short time by any ordinary workman.

These Pumps are suitable for hot or cold water, hot or cold wort, sewage, ammoniacal liquor, tar, &c., and are adapted for use in breweries, chemical works, collieries, paper mills, dye-works, brick-yards, and for almost any other purpose.

SIZES AND PRICES OF COLEBROOK'S PATENT STEAM PUMPS.

Diameter of Steam Cylinder.....Inches	1½	3	3	3	3	4	4	4	4	5	5	5	6	6	6	7	7	7	7	7	8
Diameter of Pump Cylinder.....Inches	1	1½	2	2½	3	2	2½	3	4	3	4	5	3	4	5	6	3	4	5	6	7
Length of Stroke.....Inches	6	12	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Price.....	£12	£16	£17	£18	£19	£19	£20	£22	£25	£23	£28	£32	£26	£33	£36	£41	£30	£38	£41	£45	£52
Diameter of Steam Cylinder.....Inches	8	8	8	8	9	9	9	9	9	10	10	10	10	10	10	12	12	12	12	12	12
Diameter of Pump Cylinder.....Inches	5	6	7	8	5	6	7	8	9	5	6	7	8	9	10	6	7	8	9	10	12
Length of Stroke.....Inches	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Price.....	£45	£50	£56	£65	£50	£55	£60	£70	£81	£82	£68	£70	£80	£95	£100	£90	£85	£90	£100	£115	£135



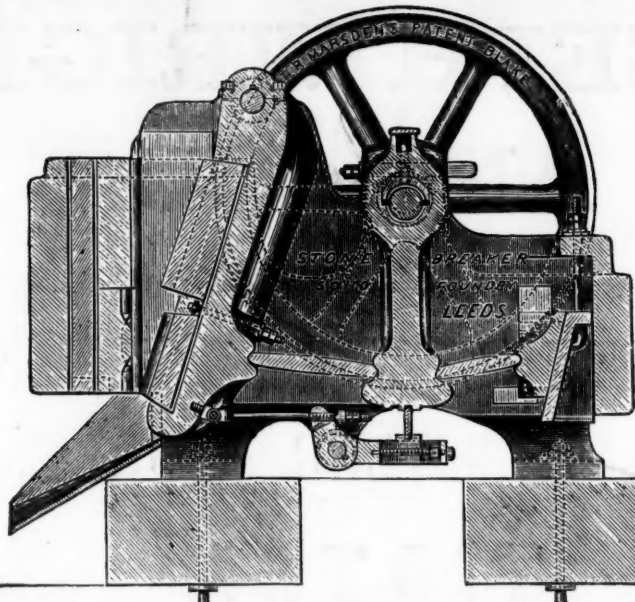
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